

NAVAL POSTGRADUATE SCHOOL
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THESIS

**THE 2000 ARMY AVIATION MODERNIZATION
PLAN EFFECT ON ACTIVE COMPONENT ARMY
AND ARMY NATIONAL GUARD
INTEROPERABILITY AND INTEGRATION**

by

Eric M. Bleakney

December 2000

Thesis Co -Advisors:

Harold A. Trinkunas
Dana P. Eyre

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ON ACTIVE COMPONENT ARMY AND ARMY NATIONAL GUARD
INTEROPERABILITY AND INTEGRATION**

Eric M. Bleakney
Captain, Pennsylvania Army National Guard
B.S., Slippery Rock University, 1986

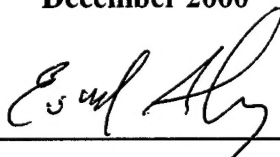
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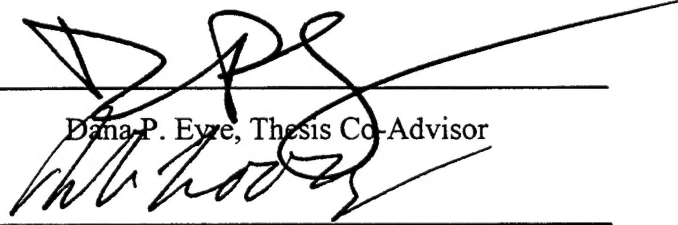


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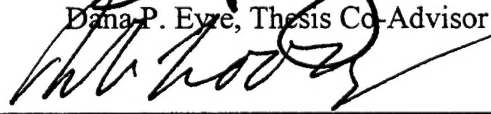
Approved by:



Harold A. Trinkunas, Thesis Co-Advisor



Dana P. Eyre, Thesis Co-Advisor



Fredrick Rocker, Chairman
Department of National Security Affairs

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ABSTRACT

In this thesis, I examine the 2000 Army Aviation Modernization Plan using interviews, review of Program Objective Memorandums (POMs), Government Accounting Office (GAO) reports, records of congressional testimony and other supporting documents. I argue that non-integration is culturally imbedded in the Army. The cyclic patterns of build-up and teardown of the Army before and after conflicts have been replaced by a necessity to provide one integrated and interoperable force capable of continuous full spectrum operations. I have four major findings: First, favorable changes are evident in planning and coordination activities. These epic efforts from the three components are bound to improve integration and interoperability. Secondly, inadequate funding of the 2000 Army Aviation Modernization Plan causes integration and interoperability to either remain constant or decrease. Thirdly, the Army National Guard needs the second utility company of the multi-functional battalion in the RC Division structure to support dual mission requirements. Finally, funding for the Comanche program comes at the expense of Army National Guard and Active Component Army integration. Consideration should be given to cutting the RAH-66 program and applying alternative solutions that improve integration and interoperability of the Army while modernizing the components concurrently.

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EXECUTIVE SUMMARY

The purpose of this research is to study the impact of the 2000 Army Aviation Modernization Plan on Active Component Army and Army National Guard integration and interoperability. The thesis recommends a course of action that will enable the Army National Guard Aviation branch to develop an aviation integration plan that builds on current Active and Reserve component modernization efforts and concurrently promotes support for both state and federal mission requirements. The 2000 Army Aviation Modernization Plan, introduced in the spring of 2000, is designed to modernize both the Active Component Army and the Army National Guard. The new global era necessitates a break from the cultural non-integration of the Active Component Army and Army National Guard. I argue that it is necessary to improve integration and interoperability to prepare for a full spectrum of missions rather than the traditional cyclic build-up for a conflict and draw-down of components after a conflict. I recognize four major findings in this thesis, of which only the first improves integration and interoperability. The remaining three findings of my research either do not improve or actually hinder integration and interoperability.

First, cultural changes that benefit integration are evident. Active Component Army and Reserve Component leaders are working toward the best modernization solutions as a team.

Secondly, a lack of adequate funding for the 2000 Army Aviation Modernization Plan causes integration and interoperability to either remain constant or decrease.

Thirdly, the 2000 Army Aviation Modernization Plan does not provide sufficient utility aircraft to fulfill dual domestic missions despite the positive cultural changes. The Army National Guard needs to keep the second utility company of the multi-functional battalion in the RC Division structure to support dual mission requirements. The communities supported by the Army National Guard on a daily basis expect what they have always been provided: a blanket of security in times of distress. Losing that trust will cause deterioration of the civil-military bond that is crucial to our service.

Finally, I conclude that the Comanche program is too expensive because of the trade-off it demands in Army National Guard integration and interoperability. Alternative programs of modernization also would improve component inter-relationship. The procurement, operations, maintenance, and fielding costs of the Comanche are greater than the budget allows without sacrificing Army National Guard integration and interoperability.

By contrast, the USMC and the USAF have integrated their reserve forces very effectively. The USMC H-1 upgrade and the USAF expeditionary force initiatives are compared to the 2000 Army Aviation Modernization Plan. The USAF and USMC programs are good examples of successful methods of modernization and integration.

My findings and recommendations are drawn from an analysis of the 2000 Army Aviation Modernization Plan, interviews, Program Objective Memorandums, Government Accounting Office Reports, records of congressional testimony and other supporting documents.

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I. INTRODUCTION

Legislation, funding, and management of the Army are meant to bring the active and reserve component forces together as one cohesive fighting force, yet the Active Component Army (AC) and the Army National Guard (ARNG) continue to exhibit tensions when working together. This research explores: (1) The history of Active Component and Reserve Component (RC) tension; (2) the obstacles to force integration; (3) whether the 2000 Army Aviation Modernization Plan continues the non-integration of Active Army and Army National Guard Rotary Aviation, or whether it address integration issues effectively; and (4) how to proceed with modernization in a manner that promotes branch integration in the most effective way possible.

Political, institutional, and budgetary support for the large number of mission assignments associated with the changing threat scenarios in the global era have compelled the nation to manage Army aviation resources differently from in the past. Total force integration of the aviation branch has been designed to support the National Military Strategy, Joint Vision 2010, Joint Vision 2020, and the Army Vision. The resulting relationship between the Army National Guard (ARNG) and AC aviation branch has a critical impact on national defense in this new era. Political and institutional awareness of both modernization and integration issues became obvious when Congress requested an Army Aviation modernization plan in 1998. The plan to modernize the Army aviation branch has been developed by the U.S. Army Aviation Center, Fort Rucker, Alabama (USAAVNC), for submission to Congress in CY 2000. The modernization plan's recommendations shape the future structure, management and force ratios of the AC and

ratios of the AC and RC Rotary Wing aviation assets. The force modernization plan will dramatically influence Army aviation operations in the future.

In this research, I will examine the historical “non-integration” of the Active and Reserve component rotary wing aviation structure. Civil-military obstacles to force integration that result from or are related to the modernization effort are emphasized. Political, institutional, and budgetary aspects of the plan are examined and a recommendation is provided that promotes integration of the forces. The recommendation provides critical planning information to the public, the ARNG, and the AC. The research also provides insight for industry leaders and military planners into contractual, budgetary, and political considerations relevant to structuring a fighting force capable of supporting both state and federal missions in the “global era” environment.

I focus my research on the following questions: Why are the AC aviation branch and the ARNG not integrated, given that Army integration is an asset in war fighting and contributes to combat overmatch? What political, institutional, and budgetary issues have kept the AC aviation branch and the ARNG from integrating in the past? How have we tried to integrate the two components since the end of the Cold War and why have we been unsuccessful? How will the 2000 Army Aviation Modernization Plan promote or inhibit the integration of these forces? What success have the Marine Corps and the Air Force had integrating their forces? What are the obstacles to our integration and how can we proceed?

The primary argument of the thesis is that the AC aviation branch and ARNG aviation forces are not well integrated. Secondly, I argue that the 2000 Army Aviation

Modernization Plan attempts to remedy this by including both AC and ARNG in a modernization effort. Finally, I argue the USMC and the USAF have developed modernization plans that integrate the reserve forces and promote interoperability between the components. Our two sister services improved their integration and interoperability while modernizing. The Army can learn from these examples and adopt a few alternatives that would serve to improve integration and interoperability while simultaneously modernizing the rotary wing fleet of both components. The ARNG rotary wing aviation force represents approximately 50 percent of the total helicopter assets available to our nation's Army. I argue that the National Guard is grossly out of synchronization with active component aviation. The helicopters and support equipment assigned to our National Guard units in many instances no longer are being utilized by the active component. The 2000 Army Aviation Modernization Plan takes the legacy fleet and structure into consideration, yet skirts the underlying integration issues that led to the force separation in the first place. I also argue that obstacles to modernization still exist under this new plan and must be overcome to fully implement the force integration effort. Successful modernization depends on concerted efforts to comprise missions, force structure, training dollars, and equipment. Leaders must adjust the strategic balance of forces to mission, budget, and threat for both services. Force structure, mission assignments and supporting civil-military systems must be managed to ensure that modernization recommendations include the Total Force integration concepts.

My findings are supported by interviews, records of congressional testimony, Government Accounting Office reports (1994, 1999 and 2000), and numerous other

supporting documents. I interviewed a group of technical experts from the Army, Army National Guard, Marine Corps, Army Reserves, Force Development, the Joint Staff, RAND Corporation, the helicopter industry, and the Air Force. This team provided guidance and suggestions to improve, correct, and emphasize essential elements of the thesis based upon our discussions. Each of the individuals was asked to assist with research validity and enhancement, and to stress the political, institutional, and budgetary aspects of integration.

This thesis will first examine existing tensions between the Active and Reserve components that inhibit total force integration. This historical overview will provide a framework for discussing why attitudes among military and political leaders seem to impede implementation of integrated Army modernization.

I then examine the Post-WWII efforts to modernize the force. I introduce the “global era,” as a tangible time period that begins after the end of the Cold War and after Desert Storm. The global era’s characteristics, and the modernization efforts and full spectrum responsibilities it entails, are explained. I argue that Army and Guard rotary wing aviation integration has not been effective since the end of the Cold War, and that because of the changing world, we no longer can afford the modernization methods of the past. I summarize positive steps the AC and ARNG have taken from the Cold War to the present toward real integration.

Key elements of the 2000 Army Aviation Modernization Plan are introduced. The plan outlines the USAAVNC concept of aviation integration and aviation branch war fighting methods for the future. Special attention is paid to the political and institutional

challenges associated with the plan's concepts. I also argue alternative methods to modernization that better support integration and interoperability of the Army National Guard than the 2000 Army Aviation Modernization Plan.

I compare the Army modernization plan to Marine Corps and Air Force plans. The Marine Corps and Air Force apparently integrated their reserve component assets more successfully than the AC has integrated with the ARNG. My evidence is reinforced by GAO findings in 1994, 1999 and 2000, as well as in interviews.

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II. HISTORICAL BARRIERS TO INTEGRATION OF THE ARMY NATIONAL GUARD AND ACTIVE COMPONENT ARMY AVIATION

In this chapter, I analyze the cultural barriers that have developed from colonial times into the global era between the Active Component Army and Army National Guard. The modernization, integration, and interoperability of the ARNG and the AC have varied since colonial times. The ARNG and Army Reserves (AR) each have different roles from that of the AC. This research focuses on the Army National Guard and Active Component Army relationship rather than the Army Reserve or Air National Guard, although each component and service is recognized as a valuable asset.¹

The chapter is divided into three sections. The first section deals primarily with the rise of cultural barriers. I cite several examples to argue that a continuous and prolonged integration problem has existed between the two services. The second section outlines the history of Army aviation. Cultural barriers and technical and budgetary constraints have caused managers to modernize the Army by cascading old AC equipment to the ARNG. The effects of these modernization methods are a perpetuation of component non-integration and a lack of interoperability. In the final section of this chapter, I discuss changes in the world that place a premium on integration and interoperability. The post-Cold War period is over. A fully integrated and interoperable force is needed to meet the intent of the National Military Strategy and Joint Vision 2020. I argue that the cyclical expedient of cascading equipment from the AC to the ARNG should be replaced with a fully integrated and interoperable force capable of responding

to a full spectrum of missions. I identify this new period of global missions and force configuration as the “global era.”

Long before the aviation branch was formed, a program to cascade legacy equipment to the Guard existed. Only since the end of the Vietnam War has the ARNG acquired newer equipment in any measurable amount. A variety of power groups, including politicians, industry and military leaders have influenced the integration of the forces. The cause of the apparent imbalance, however, is not so important to this research as is the effect. This chapter presents strong evidence that these problems are culturally and historically imbedded, rather than isolated in the current organization. Cultural, political, and budgetary pressures have affected the ability of the Army to perform the dual state and federal missions that accompany the dual tradition.²

A. ARMY AND ARMY NATIONAL GUARD CULTURAL BARRIERS

The United States historically has never had an integrated army. The working class Protestant pilgrims of Virginia, Plymouth, Massachusetts Bay, and Connecticut established three military regiments by the end of 1672.³ The military tactics they developed during the 17th century came from fighting Indians on the frontier, and

¹ One exception to this method of analysis is the use of the USAF Air Expeditionary Force integration plans and the USMC H-1 upgrade plan as a case study in chapter IV.

² To clarify a potentially confusing set of terms; dual tradition refers to using a combination of Regular Army (AC) and Reserve Components (RC) for national defense. The term dual mission is used here to define the Army National Guard domestic (State) and international (Federal) mission. Statutory limits have been imposed on the President for the PSRC. Not more than 30,000 of those called can be members of the Individual Ready Reserve and those called are limited to 270 days of federal active duty. (Defense LINK, U.S. Department of Defense, 27 April 1999, available online <http://www.defenselink.mil/news/Apr1999/b04271999_bt197-99.html> accessed 13 September 2000).

³ “National Guard Detailed History”, Chap. 1, p. 2. National Guard Bureau Website. (Arlington, VA, accessed 10 March 2000); available from <http://www.ngb.dtic.mil/aboutng/history/det_hist/dh_index.htm . Thru chap13.htm> accessed 20 July 2000.

included the temporary mobilization of settlers for sustained operations. Volunteer regiments called "Provincials" were hired to fight specific campaigns. Even during this early period, a dual tradition (active army and militia) was beginning to emerge. A dual set of missions is recognizable: major conflicts, fought with hired or professional troops; and a militia to handle domestic threats, the training of citizens in warfare, and policing actions near home.⁴ Many colonists were opposed to a standing army, but they recognized a real need to defend home and community from both Indians and natural disasters. The militiamen organized to fill the need, providing their own weapons to form local defenses.

In the late 1700s, sentiments against a large standing army were widespread. In 1777, Congress adopted the Articles of Confederation, which clearly indicated a lack of trust not only in a Federal army, but also in a Federal government. In response to Shay's rebellion in 1786, the Constitutional Convention of 1787 met to amend and revise the Articles of Confederation. The Bill of Rights, an electoral system, and the U.S. Constitution emerged from this convention. The Constitution's framers sought to divide, restrict, limit, check, and balance federal powers. This balance stymied majority tyranny, but also was, by design, sluggish and unresponsive to majority demands.⁵ The Constitution embodies the tension between the need for a strong government to provide

⁴ James Morris writes: "Because of their bad experience with standing armies in 17th century England at the time of the Stuarts, during the Commonwealth and Protectorate, and during the period of the Restoration, a widespread distrust of standing mercenary armies was brought to America by the English colonists. They were seen as an unchanging threat to the liberties of the people. Necessary protection, the colonists urged, could be ensured by citizen-soldiers, part-timers, who would drill regularly to learn the rudiments of military art and be on call to defend home and hearth when necessary." James M. Morris, *America's Armed Forces: A History*, 2nd ed., (Upper Saddle River, NJ: Prentice-Hall, Inc., 1996), pp. 10-12.

⁵ Paul Manuel and Anne Cammisa, *Checks and Balances*, from the series "Dilemmas in American Politics," L. Sandy Maisel, ed., (Boulder: Westview Press, 1999) pp. 61-63, 67.

for the general welfare of the citizens and a fear of the army that could provide that protection. The Framers allowed only enough federal power for common defense and “to ensure domestic tranquility.” The Second Amendment to the Constitution made the role of the militia a bit more explicit, but the system as a whole remained rather inefficient.⁶

Emphasis on separate missions for the Active Component Army and the Army National Guard continued through the Madison and Jefferson administrations. Ironically, the early period of exasperation between the regular and reserve forces may not have come from the soldiers themselves, but from political elites and members of society. Civil-military, active and reserve component integration issues became apparent as the country grew. Following the War of 1812, and especially with the Depression of 1819, opinion turned against high military expenditures for a strong standing army.⁷ The legendary Davy Crockett argued that money spent at West Point would be better spent on the militias. John C. Calhoun, Secretary of War between 1817 and 1825, strongly defended the Regular Army and fended off many of the attacks. The two critical questions were: First, does the country need a strong standing army; and second, are the career officers fit to command in the New World?⁸ Many civilians considered the officer corps aristocratic, flabby, and arrogant. Cadets allegedly were chosen from influential, anti-republican, and well-to-do families--rich kids with scholarships who had not received real military training. The less-than-distinguished careers of many militiamen were forgotten in the period following the War of 1812. The citizen soldiers seemed to be remembered

⁶ Lecture by Professor Rodney Minott, Naval Postgraduate School, 23 February 2000.

⁷ Robert C. Kemble, *The Image of the Army Officer in America*, (West Port, Conn: Greenwood Press, 1973), p. 4.

⁸ *Ibid.*, p. 36.

only for their few successes. As the country moved toward a bloody civil war, however, the militia and volunteer units, while held in high regard, were deteriorating from lack of funds, leadership, and goals.⁹

The National Guard Association (NGA) was formed in 1879. NGA officers advocated that: (1) The Guard was a component of the military; and (2) the Guard was a militia force rather than a military establishment under control of regular officers. In essence, the NGA perpetuated the Republican-Democratic belief that a strong Regular Army was not needed, and that having one could actually endanger citizens. Formal organization continued with legal authority from the Constitution's Article 12, Section 8, which allows Congress to raise and support armies. General George W. Wingate sought to bring the Guard and Regular Army closer together in 1871 by establishing marksmanship competitions. Even then, the Regular Army used modern equipment, the Springfield Model 1873 .45 caliber rifle, while the Guard was fielded with cascaded Civil War pieces. The Guard did not get the Springfield until 24 years later, in 1897.¹⁰

Following the Spanish-American War (1898), the ARNG still received neither pay nor allowances. Robert Kemble describes a civil-military conflict that arose with the nation's increasing industrialization, outlined in articles written by Andrew Carnegie between 1898 and 1899 for the journal *North American Review*.¹¹ Carnegie stated that the professional soldier was not representative of triumphant American patriotism, morality,

⁹ Ibid.

¹⁰ John K. Mahon, *History of the Militia and the National Guard*, from the series "The Macmillan Wars of the United States," Louis Morton, ed., (New York: MacMillan Publishing Co., 1983), p. 120.

¹¹ Kemble, *The Image of the Army Officer*, p. 113.

and efficiency. He felt the Regular Army was a cornerstone of imperialism and that it therefore should be kept weak and ineffectual. He berated professional soldiers, yet he praised the militia's activities. William G. Summer declared, in contrast, "part-time soldiers at any level were likely to corrupt military efficiency and justice." He went on to applaud the professional military officer. In many cases, outspoken elites exhibited an attitude that pitted the military officer against the private business elites' nobility and success. The effect on the Army was to isolate them as a dangerous, but necessary, part of society.¹²

Secretary of War Elihu Root was directed by President McKinley at the beginning of the 20th Century to study the army. Among Root's many significant contributions: (1) He replaced the position of Commanding General of the Army with the position of Chief of Staff; (2) he established the Army War College; and (3) he wrote the Dick Act, which started the National Guard, in most states, along the path to federalization.¹³

The Regular Army lacked confidence that the ARNG could support a federal deployment. The ARNG's small, imbalanced structure, its inability to mobilize and deploy overseas, and the dual mission requirements were seen as severe hindrances to the ARNG's ability to defend the country.¹⁴

¹² Ibid.

¹³ Charles Dick was an Ohio guardsman, chairman of the House Committee on Militia, and president of the National Guard Association. The Dick Act recognized the Army National Guard as first defenders of the nation. They were to be called first in the event of mobilization. They were to receive federal monies for training 5 days in the summer and for equipment. In addition, the Regular Army was to assist them with training when requested by the governor. The ARNG also would be available for federal activation for up to 9 months; however, they were restricted to the Continental U.S. The President signed the bill on 21 Jan 1903. Mahon. *History of the Militia*, p. 139.

¹⁴ Michael D. Doubler, LTC, "Guard Century, Century of Change, Century of Contribution: A Militia Nation Comes of Age," *National Guard Magazine*, available Internet < <http://www.arng.ngb.army.mil/home/History/history.htm> > accessed 20 July 2000, p.4.

The National Defense Act of 1916 was signed by President Wilson on 3 June 1916 in an effort to make more soldiers available to fight in WWI.¹⁵ The Army National Guard History archives claims:

“The ARNG played a major role in WWI. Its units were organized into divisions by state, and those divisions made up 40 percent of the combat strength of the American Expeditionary Force. Three of the first 5 U.S. Army divisions to enter combat in WWI were from the ARNG.”¹⁶

National Guardsmen claimed the Regular Army did not capitalize on the unit morale inherent in these traditional organizations. The tensions between the political leaders, businessmen, the AC and the ARNG clearly still flourished.¹⁷ After WWI, the Regular Army once again proposed to make itself stronger, and planned to maintain a reservoir of 500,000 reservists. The ARNG found congressional support to oppose the AC's plans. The National Defense Act of 1920 favored a smaller active force reinforced by standing units of the ARNG and organized reserves. The Act further set ARNG strength at 435,000 and the AC at 280,000. The Regular Army assumed overseas, border and expeditionary duties. The ARNG would provide a pool of officers and train conscripts.¹⁸

The ARNG and Reserve contributed to U.S. efforts during WWII in numerous ways. First, just before the war, they provided an organized body of men for national

¹⁵ Mahon, *History of the Militia*, pp. 148-149.

¹⁶ *Army National Guard History*, Army National Guard Official Website, 10 March 2000, revised 29 April 1999, available Internet: <<http://www.armg.ngb.army.mil/home/history/history.htm>>, accessed 20 July 2000, p. 6.

¹⁷ *U.S. Army Aviation*, Army Aviation Museum Foundation, (Fort Rucker AL, Somerville, NJ: Lord & Field, 1993), pp. 3-35.

¹⁸ Michael D. Doubler, LTC, “Guard Century, Not So Calm Before The Storm, 1920-1940” *National Guard Magazine*, 11 March 2000), available Internet: <<http://www.ngaus.org/ngmagazine/guardcentury-1920to1940-1099.asp>>, accessed 20 July 2000, p. 2.

defense. Second, guardsmen fought effectively as individuals and as integrated units. Third, the ARNG provided a critical supply of officers. Finally, the ARNG assisted with the development of the Armor Corps.

In October 1945, Major General Milton Reckard was asked to chair a combined committee assigned to study the post-war army structure. The committee concluded that the ARNG should fill a larger role.¹⁹ During this inter-war period, the Air Guard was created (1947). Other military reorganization included the creation of the position of Secretary of Defense; establishment of the National Guard Bureau Headquarters on 1 October 1948; and, the creation of the Joint Chiefs of Staff (JCS) in 1949, when the National Military Establishment was renamed the Department of Defense (DOD).²⁰

Civilian leadership of the military is crucial to American democracy. Political leaders made changes to military organization over the years that influenced both integration and interoperability of the Army components. Before the 1960s, for example, the Secretary of War rather than the Secretary of Defense permitted the military to make procurement decisions. Robert McNamara, Secretary of Defense for both Presidents John F. Kennedy and Lyndon Johnson, felt it should be his responsibility to make these procurement decisions. Since McNamara's tenure, the Secretary of Defense has made the

¹⁹ (1) The Army National Guard was: (1) to be an integral part and first-line reserve component; (2) Army National Guard and Regular Army strength would be kept sufficient to make a balanced world-wide deployable force; and (3) the Army National Guard position in the General Staff would be expanded, with at least one member of the Guard on duty with the Staff. Mahon, *History of the Militia*, p. 196.

²⁰ Michael D. Doubler, "Guard Century, A New Super Power Emerges: 1940-1960," *National Guard Magazine*, 11 March 2000, available Internet: <<http://www.ngaus.org/educational/guardhistory.asp>>, accessed 20 July 2000, p. 4.

procurement decisions for civilian-led programs, rather than those with military directors.²¹

The primary soldiers who fought in Vietnam (1964-1974) were active component draftees, while the ARNG became a haven for those who chose to avoid the conflict overseas. Guardsmen were, however, used extensively to control anti-war and racial riots in America. Because President Johnson did not use the Guard in Vietnam, he indirectly weakened the component strength of the Guard, the strength of the Regular Army, and civilian support for the conflict in South East Asia. Following Vietnam, drug, race, and disciplinary problems within the armed services were common. The end of the draft in 1973 left the Army in terrible shape. Civil-military relations were atrocious. Force downsizing and the zero defect policy left an already strained force paranoid. During this period, the focus was not on war fighting skills, but on keeping one's job.²²

The AC and RC grew in size and strength. The Reserves trained, schooled, and were provided equipment increasingly like their AC counterparts throughout the 1970s and 80s. Cultural non-integration and challenges to interoperability between the AC and ARNG remained, however, because of the policy of cascading older equipment when newer equipment arrived for the first-to-fight units. Modernization continued, albeit at unequal rates, between the active component and reserve components. In 1989, when the Berlin Wall fell, Guard strength was at peacetime high of 456,960. Because of the

²¹ David Sorenson states: "The change in authority has been justified because, arguably, the military reflects parochial priorities instead of National needs when it chooses weapons. Critics of the military have claimed weapons decisions are driven as much by inter-service rivalries over roles and missions as they are about National Defense." David Sorenson, *The Politics of Strategic Aircraft Modernization*, (Westport: Praeger, 1995), p. 3.

²² Lecture by Professor Ken Dembroski, Naval Postgraduate School, Monterey, Calif., 14 March 2000.

decreased threat with the end of the Cold War, President Bush advocated cuts of up to 25 percent in the military.

During the Persian Gulf War (1992), more than 60,000 ARNG personnel, almost 15,000 Air Guards, and 32,000 additional Guardsmen and women in the United States served. Most of the RC activated were combat support or from Combat Service Support units. Political and national support for the effort in the Gulf was very positive.

The draw down in force of the 1990s caused more integration problems between the Regular Army and the Army National Guard. Turf wars over structure, the Base Realignment and Closure Commission, and missioning fueled the endless debates over strong regular or reserve forces. Funding competition for readiness, modernization and operational needs prevailed as the dollars dwindled and mission assignments mounted.

The defense budget decreased after the Cold War, but the number of missions for the Army increased. General Raymond F. Rees, Vice Chief of the National Guard Bureau, stated in a briefing on 9 March 2000 that during that year alone, the Guard was deployed to 44 states and 29 countries, using 4,154 soldiers and 1,239 airmen. The ARNG is transitioning from Force XXI to the "Army Objective Force." It is conducting exercises, joint training, WMD missions, air defense and sovereignty missions, national missile defense exercises, counter-drug operations, information operations and homeland defense. Missions other than war, homeland defense, and the Army strategy, however, seem to be contradicted by tight budgeting and resourcing trends.

This history demonstrates that component friction has existed since colonial times. Furthermore, the pattern is cyclical and continues today.

B. ARMY AVIATION HISTORY

Thaddeus S. C. Lowe sold an idea to President Lincoln that hot-air balloons would be of beneficial service to the Union Army. The end of the Civil War placed the Balloon Corps under command of the Signal Corps.²³ This marked the beginning of an aviation force to support the Army ground commander.

The Wright brothers flew at Kitty Hawk, NC on 17 December 1903. Brigadier General James Allen established the Aeronautical Division within the U.S. Army Signal Corps in August 1907. Congress codified these Army air activities on 18 July 1914 when it created an Aviation Section within the Signal Corps.²⁴

By the end of WWI in November 1918, the United States had 39 air squadrons performing some form of aerial combat. Between WWI and WWII, however, postwar Army leadership and a lack of resources stymied the growth of aviation.

The Air Guard nevertheless came into existence before WWII. As Army aviators came back from the Great War, the ARNG was eager to take advantage of their skills. The Air Service was renamed the Air Corps on 2 July 1926, but there was very little research and development done in this period.²⁵

On 9 March 1942, the War Department established three separate commands within the Army: Army Air Forces, Army Ground Forces, and Army Service Forces. The mission given to the Army Air Forces was to support the Army.²⁶ Army aviation has

²³ James Bradin, *From Hot Air to Hellfire, The History of Army Attack Aviation*, (Novato: Presidio Press, 1994), p. 49.

²⁴ Ibid., pp. 50-51.

²⁵ National Guard Detailed History, Chap. 10, p. 1.

²⁶ Bradin, *From Hot Air to Hellfire*, p. 57.

grown and changed dramatically over the years. One of the first changes occurred with new guidelines for development of the Army flying corps when the National Security Act of 1947 established the United States Air Force (USAF) as a separate service. USAF and Army aviation areas of responsibility were defined by a number of adjustment regulations, and particularly by the 21 April 1948 Key West Agreement. The Army had 57 Utility helicopters in June of 1950; by December 1952, the Army had 647 Utility and 72 Cargo helicopters, for a total of 719 helicopters of both types.²⁷

The period between WWII and the Korean War was one of stagnation for Army aviation. President Harry S. Truman, a veteran of WWI and retired Army Reserve colonel, was in his second term. He harbored resentment and distrust for the Active Component Army. Truman reduced the military from 12 million to 1.5 million men in a very short period after WWII. It was in this environment that the Army tried to develop rotary wing aviation with little success.²⁸

Between 1950 and 1954, helicopters were given their first tactical role. The Army used helicopters in both Korea and Vietnam. Casualty evacuation fatalities decreased from 4.5 percent of the injured in WWII to 2.5 percent in Korea, then to 1 percent in Vietnam, as the helicopter assumed an increasing role.²⁹

Air mobility, air cavalry, and close air support became the trademark of the Army aviators in Vietnam. New doctrine, increased mobility, armed helicopters, and a shift

²⁷ Richard Weinert, Jr. *A History Of Army Aviation-1950-1962*, (Fort Monroe: United States Army Training and Doctrine Command, 1991), p.47.

²⁸ Bradin, *From Hot Air to Hellfire*, p. 82.

²⁹ Brian Walters, "Attack and Tactical Utility Helicopter, A Time for Bold Procurement," *ADJ Asian Defence Journal*, October 2000, pp. 24-28.

from the Army Transportation Corps to a more robust lighter combat force occurred with the introduction of new, more capable rotary wing systems. The H-34 "Choctaw" was sent in small numbers to Vietnam. The H-21 "Shawnee" served as a multi-purpose helicopter in the early stages of the Vietnam War. The UH-1 "Iroquois," which entered service in 1959, went to Vietnam in 1962 with the Utility Tactical Transport Company and continues in service today. The armed version of the UH-1A was designed with one third more horsepower and was designated the UH-1B. In 1965, Bell Helicopter introduced the AH-1 "Cobra" gunship. This AH-1G was the first helicopter procured specifically as an attack helicopter. The Bell OH-58A "Kiowa" made its appearance in 1968. The CH-47 "Chinook" flew supplies, weapons transport, recovery, and medical evacuation in Vietnam.³⁰

At the end of the 1950s, the Army had 2,489 helicopters. Ten years later, the number of helicopters had grown by 383 percent, to 9,528. These helicopters required thousands of support personnel and 24,000 pilots.

Four primary advancements were made to Army aviation because of the Vietnam War. First, the size and expansion of the aviation force was formidable. Second, Army aviation improved transport capabilities for ground commanders. Third, armed helicopter development paved the way for a completely new method of helicopter utilization. Finally, air mobility had the legitimacy of proven combat. Yet, these advancements were threatened after the withdrawal from Vietnam in 1975.³¹

³⁰ *U.S. Army Aviation*, pp. 18-27.

³¹ Mathew Allen, *Military Helicopter Doctrines of the Major Powers, 1945-1992: Making Decisions about Air-Land Warfare*, (Westport: Greenwood Press, 1993), pp. 14-18.

The AC was receiving improved aviation systems for warfighting, while the ARNG did not modernize during the war. After Vietnam, a painful restructuring of an Army plagued by poor morale, substandard leadership, inadequate training, failed conscription and non-integration of the reserve components was undertaken. However, the cascading of aircraft tended to support integration and interoperability because as the Army decreased in size, the ARNG was modernized with relatively new cascaded equipment, and crews capable of operating and maintaining the equipment.³²

All services and the Army components were to be integrated into a whole or joint force because of the changing world threat. This task was to be accomplished with the help of General William E. DePuy, the first Training and Doctrine Command (TRADOC) Commander. Ground commanders viewed integration of attack helicopters and ground units favorably because of the readily available aerial fire support they offered.³³

The so-called Ansbach trials, which closed in 1974, were designed to test the effectiveness of the helicopter in an attack role. These flight tests proved that attack helicopters equipped to fire long-range missiles were of considerable tactical value. The AH-1 Cobra was chosen over the Cheyenne attack helicopter to fulfill this role while the AH-64 was in development. The service's doctrine, organization and aviation equipment were reviewed. The result was a Combat Aviation Operations manual that established the Army Aviation Airland Battle doctrine.³⁴ The Airland Battle doctrine replaced the Active

³² COL George J. Gluski, Assistant Commandant, USAAVNC Fort Rucker AL, interview 24 August 2000.

³³ Allen, *Military Helicopter Doctrines*, pp. 25-33.

³⁴ Using Leavenworth Paper No. 16, "*Deciding What Has To Be Done*," and the 1976 FM 100-5 (Operations), the military developed a doctrinal method that would become the "*Airland Battle Doctrine*." General DePuy developed the Active Defense doctrine that guided the Army throughout the 1970s. BG William Maddox, the director of Army

Defense doctrine in 1982 with the fielding of FM 100-5 (Operations). Depth, mobility, agility, maneuverability, and initiative were stressed. Army aviation was considered crucial to the development of agility and mobility. Finally, deep battle for offensive operations up to 150 kilometers across the Forward Line of Troops was considered. The AH-1 "Cobra" was a perfect match for these operational needs.³⁵

On 30 November 1981, a separate Aviation Branch was proposed at the U.S. Army and Command Staff College at Fort Leavenworth, Kansas. On 31 March 1982, the aviation officer at Headquarters Department of the Army outlined the rationale for a separate Aviation Branch. On 12 April 1983, the Secretary of the Army signed the approval to make aviation the 15th Basic Branch of the U.S. Army.³⁶

The 1993 Aviation Restructuring Initiative (ARI) changed the H Series Modified Table of Organization and Equipment (MTOE) from organizations that had more than one primary aircraft per battalion to organizations that had only one primary aircraft and one primary mission per organization. Under ARI, the ARNG received cascaded equipment while the AC modernized with the AH-64, UH-60, and CH-47. The ARNG has received some modernized airframes since the inception of ARI, but many ARNG organizations still are equipped with the older AH-1, UH-1, and OH-58 aircraft. The

Aviation, insisted our thinking, techniques, tactics, training, and equipment had to change in order to support the Active Defense doctrine. Commanders enjoyed a three-dimensional battlefield for the first time in Vietnam, but there were no assurances on the survivability of aviation in the mid- or heavy- intensity conflicts TRADOC projected. Tactical changes were required to counter the threat of the Soviet-made SA-7 Grail surface-to-air missile and other mid- to heavy-intensity conflict issues that had ground commanders concerned about the survivability of aviation. Ibid.

³⁵ Ibid, p. 35.

³⁶ *The Chronological History of Army Aviation*, (Fort Rucker: Aviation Branch Historian, 1980-1989), available Internet: <http://usasam.amedd.army.mil/AV_History/1980-1989.htm> accessed 15 September 2000.

ARNG and AC currently are suffering from a lack of integration and interoperability, a problem the current modernization plan attempts to address.

C. THE GLOBAL ERA EMERGES FROM THE COLD WAR

The “global era” is a term I use to identify the current full spectrum of responsibilities identified in the U.S. National Military Strategy, following the post-Cold War era. I argue that the global era redefines the role of the military. Cascading has become less feasible because doctrine is dependent upon a high level of technical proficiency. Global era technology also has introduced another level of complexity and expense for military modernization programs. Thomas L. Friedman, in “The Lexus and the Olive Tree,” outlines the effects of globalization on post-Cold War organizations. Army Aviation must plan past the post-Cold War period, looking toward the next threat rather than back to the last one. We no longer are post-any war. We are preparing for the next war within the constraints of the global era, an era where currency can be passed across borders and the Internet has provided us with a tool that has changed the way that global systems work and interact. In the global era, anyone can tell who polluted a river through satellite imagery. International communication occurs via Net meeting, ICQ Chat, and email. If someone wants another Field Manual, he can just log on and download from the .PDF file. If you need intelligence information for a deployment, go to the CIA page. Travel- and time-phased force deployment data can be downloaded via secure means. If a financier wants to invest in an emerging market in Chile, he can take his PDA to lunch, log on and move money from his account to an emerging business in a matter of seconds. The global era is a time of full spectrum military operations influenced

by the digitization of the world. It is a period of satellite communication, global positioning, and instantaneous position updates. What about the changing threats in the global era? How do we compensate for these new emerging threats with reduced procurement and modernization funds? Technology is our answer. We have modern, capable, digitized, and very expensive systems to combat both the old and the global era threats in a full spectrum of operations.

The global era is not a safe age. It is a time of new democratic institutions, but also of more uneasiness in world economies. The era is for the quick, the "E-now" generation, and the young, electronically perceptive supercharged soldiers of tomorrow. The global era requires education, entrepreneurship, and economic (Triple "E") understanding to run a business, including the national defense business. First, we need leaders that have the techno-savvy to purchase the correct system at affordable prices. Secondly, entrepreneurship is needed to design and manage the organizations that will employ and maintain these systems. Complex equipment requires repetitive continuation training for proficiency at individual and collective levels. Assertive and industrious leadership is needed to implement the 2000 Army Aviation Modernization Plan. Finally, an educated soldier who can understand and deploy these technological advancements has to be recruited, trained and retained, or we have wasted the modernization effort. The soldier is the key to combat overmatch, equipped with a technically advanced system. Are we able to maintain readiness, transform to Force XXI, and modernize aviation with the amount of planning we have done and with the funds available?

The likelihood of doing all three (maintaining readiness, transforming and modernizing) with the funds available is unlikely. The soldier of the global era requires night vision devices, global positioning equipment, laser designation capability, secure communication, armor and a host of other highly technical and very expensive items. A helicopter may not cost nearly as much as the avionics, countermeasures or night vision devices it carries. Smart bombs, Hellfire II missiles, and air interceptor missiles cost a lot of money. In the global era, the ARNG is trying to modernize the aviation force while maintaining a state of readiness with its on-hand items. As we make trade-offs in the 2000 Army Aviation Modernization Plan, are we trading off integration and interoperability for the ARNG, or will the ARNG be a viable part of aviation within the Army?

In conclusion, the 2000 Army Aviation Modernization Plan must incorporate global era technical advancements and an understanding of the changing threats, or we will find ourselves planning for a conflict that will never materialize. We not only must plan, but we also must fund the very expensive, technologically advanced systems needed to maintain "combat overmatch" in both the ARNG and the AC.³⁷ The Army is more expensive in the global era. Funding for integration and interoperability has significant costs up front, but the benefits for the future outweigh the alternatives.

³⁷ Combat overmatch is a term used throughout the 2000 Army Aviation Modernization Plan. CPT Jeff Janey from the USAAVNC force development branch defined the term as an application of force that is larger than the opponent's. The term is somewhat ambiguous, but signifies better application of systems to ensure battlefield victory. Telephone interview with CPT Jeff Janey, Force Design Project Officer, U.S. Army Aviation Center, Fort Rucker Ala., 7 June 2000.

D. SUMMARY

Component friction seems to have been built into the U.S. political and military systems by the framers of the U.S. Constitution. Over time, factions have developed as a result of: (1) Apparent budgetary favoritism; (2) dual mission requirements and resulting tension between the AC and ARNG chains of command; (3) the influence of industrial and political leaders on military issues and policy; (4) cultural and patriotic links within each of the respective military components; and (5) the changing threat environment in the global era. These issues must be addressed to overcome the historical non-integration and interoperability issues we face in conjunction with our transition to the Objective Force under the 2000 Army Aviation Modernization Plan. We must promote a joint defense structure that incorporates an adequate, integrated, and effective balance of reserve and active components.

This chapter provided examples of Army integration problems that have existed since colonial times. These issues manifest themselves in the way we organize and the way we choose to modernize the aviation branch. The post-Cold War era is over, and the changing missions, technologies, and structures of the global era demand new methods of integrating the AC and ARNG during the modernization process. The following chapter explores what motivated development of the 2000 Army Aviation Modernization Plan and why there is congressional interest in the long-term goals of modernization, integration, and interoperability for the Army aviation branch.

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III. INTRODUCTION TO THE 2000 AVIATION MODERNIZATION PLAN

In this chapter, I argue that the push for the 2000 Army Aviation Modernization Plan was external to Army aviation. The grounding of the ARNG legacy fleet and the AC modernized fleet in 1999 drew the attention of political, industrial, and military leaders. The House Armed Services Committee has held a number of hearings to gain understanding of the lessons learned and needs associated with the Apache deployment to Kosovo as part of Task Force Hawk. In 1999, Secretary of Defense William Cohen and JCS Chairman General Henry H. Shelton pushed forward on priority issues that emphasize integration and interoperability, including Army aviation specifically. The AC, ARNG, and AR have been ordered to find ways to break historical cultural, organizational, and funding barriers to provide an Army aviation force that is equipped, manned, and ready to meet the challenges of tomorrow as part of the Objective Force.³⁸

One finding in the analysis of the 2000 Army Aviation Modernization Plan is that all three components are working in harmony toward a more modernized force. Cultural barriers to integration are circumvented through cooperative planning and negotiations. Meetings between ARNG and AC planners and developers indicate an intention to include all three components in the effort to modernize Army aviation.

³⁸ The Objective Force is comprised of four airframe types, the CH-47, RAH-66, AH-64, and UH-60. The airframes will be used in a variety of configurations throughout the transition period. The Objective Force is optimized for offensive operations while providing asymmetric capability for mobile strike and air maneuver operations. They will quickly respond to a theatre and these forces will be capable of sustainable split base operations with multiple aircraft types. "2000 Army Aviation Modernization Plan," U.S. Army Aviation Center and TRADOC internal document, 4 April 2000.

A. MOTIVATION FOR MODERNIZATION

“In a world in transition – in which there is only uncertainty – we cannot wait for stability before we act. Hesitation carries with it the sure knowledge of falling farther and farther behind. For an Army in such times as these, hesitation means a reluctance to think positively about the future – and a resistance to change. The danger inherent in hesitation is to find ourselves focusing on better methods to solve yesterday’s problems, rather than on new solutions to tomorrow’s problems.”³⁹

General Gordon R. Sullivan

In this section, I first provide the definitions for the words integration and interoperability. I then outline four reasons for the development of the 2000 Army Aviation Modernization Plan. First, I argue that senior level guidance is for the Army “to include aviation” in the integration and development of interoperable systems. Second, I show that the Government Accounting Office (GAO) also spurred interest in Army Aviation modernization. A number of GAO reports indicated that the Army’s very expensive modernization priority, the RAH-66, Comanche, was in trouble. In other words, ARNG modernization was being delayed to fund a program that the GAO found to be not viable. Third, I contend that Task Force Hawk is another of the primary events to spur interest in the development of the 2000 Army Aviation Modernization Plan. Finally, I argue that the grounding of the ARNG legacy fleet was the final motivation to field the 2000 Army Aviation Modernization Plan in the spring of 2000.

Because this thesis examines the 2000 Army Aviation Modernization Plan to determine its effect on integration and interoperability of the AC and ARNG, it is important to define the terms integration and interoperability before discussing the

modernization plan. One definition of integration can be found in FM 100-11, *Force Integration*, (Glossary 16):

“The synchronized, resource-constrained execution of an approved force development program to achieve systematic management of change, including: (1) The introduction, incorporation, and sustainment of doctrine, organizations, and equipment in the Arm; (2) Coordination and integration of operational and managerial systems collectively designed to improve the effectiveness and capability of the Army; and, (3) Knowledge and consideration of the potential implications of decisions and actions taken within the execution process.”⁴⁰

I use the following definition for this research: Integration is the synchronized and efficient, resource constrained execution of a force development program managed to improve effectiveness and operational characteristics of the Army components. The plan must include the introduction, incorporation, sustenance, and improvements of technologies necessary to pace global era technological changes. Furthermore, managerial plans must be based on knowledge, consideration, and the potential implications for both the AC and the ARNG throughout the planning and execution process.

Interoperability, according to Chairman of the Joint Chiefs General Shelton, is the foundation of interagency effectiveness. Interoperability is defined in the joint publication, JP1-02: “The ability of systems, units, or forces to provide services to and

³⁹ Gordan R Sullivan and Anthony M. Coroalles, “Seeing the Elephant, Leading America’s Army Into the Twenty-First Century,” National Security Paper No. 18 (Washington, D.C.: Institute for Foreign Policy Analysis, 1995), p. 10.

⁴⁰ FM 100-11, *Force Integration*, (Glossary 16) Headquarters, Department of the Army, 1998.

accept services from other systems, units, or forces and to use the services so exchanged to enable them to operate effectively together.”⁴¹

The first impetus toward development of the 2000 Army Aviation Modernization Plan came when the aviation branch was tasked with over-arching command guidance to integrate the reserve components and to ensure interoperability.⁴² Joint Vision 2020 focuses on interoperability, innovation, and decision superiority. General Shelton considers interoperability vital to joint, multinational and interagency partners and operations. The interoperability must include training, education, experience, cooperative planning, and skilled liaison as well as technical interoperability.⁴³

The *Army Vision* states that operations tempo (OPTEMPO) has increased since the end of the Cold War. Contingency deployments have increased from one every four years to an average of one every 14 weeks since 1989. There also is an increased likelihood of encountering non-traditional threats that include terrorism and weapons of

⁴¹ “Interoperability is the foundation of effective joint, multinational, and interagency operations.... Exercises, personnel exchanges, agreement on standardized operating procedures, individual training and education, and planning will further enhance and institutionalize these capabilities. Interoperability is a mandate for the joint force of 2020 – especially in terms of communications, common logistics items, and information sharing. Information systems and equipment that enable a common relevant operational picture must work from shared networks that can be accessed by any appropriately cleared participant. ...There must be a suitable focus on procedural and organizational elements, and decision makers at all levels must understand each other’s capabilities and constraints. ...The future joint force will have the embedded technologies and adaptive organizational structures that will allow trained and experienced people to develop compatible processes and procedures, engage in collaborative planning, and adapt as necessary to specific crisis situations.” Gen. Henry H. Shelton, JV2020 CJCS, 30 May 2000.

⁴² The Aviation Modernization Plan reads: “The product is a strategy that departs from the business as usual approach, truly addressing the Army by modernizing both the Active (AC) and Reserve Component (RC). It is a realistic plan that provides a proactive course of continuous improvement supporting the National Military Strategy, Joint Vision 2020, and the Army Vision.... A transitional force is envisioned as a first step toward the Objective Force and a means to accelerate the retirement of legacy aircraft... Aviation does not have an “Interim Force” because there is no procurement of an “Interim aircraft... Aviation is transforming directly from a legacy fleet and structure to an Objective fleet and structure.” “2000 Army Aviation Modernization Plan,” p. 20.

⁴³ General Henry H. Shelton, Joint Chiefs of Staff Chairman Releases, “Joint Vision 2020,” DefenseLINK News, available Internet from: <http://www.defenselink.mil/news/may2000/b5302000_bt294-00.html>, accessed 2 June 2000.

mass destruction. Organizations will field suites of equipment that are thoroughly integrated. General Shelton also states that interim, legacy and the transforming institutional Army will give us interim capabilities more advanced than today's Army, especially in terms of greater responsiveness, agility, versatility and deployability.⁴⁴ The Chairman is clear in his intention for the AC and ARNG to integrate.

LTG Kevin P. Byrnes Assistant Vice Chief of Staff, U.S. Army, stated: "The days of cascading our old equipment to the Reserve Component are over." General Byrnes also discussed the transformation campaign plan that the 2000 Army Aviation Modernization Plan is based on, as outlined in Table 1 below.⁴⁵

PERSUASIVE MISSIONS (Lower end of the Spectrum)	WAR (Upper end of the Spectrum)
Domestic Disaster Relief	Raids
Environmental Operations	Strikes
Domestic Civil Support	Insurgencies
Military to Military Contact	Counter-Insurgencies
Arms Control	Limited Conventional Conflict
Humanitarian Assistance	Regional Conventional War
Security Assistance	Tactical Nuclear War
Counter Drug	Global Conventional War
Show of Force	Strategic Nuclear War
Peace Operations	
Non-Combatant Evacuations	
Counter-Terrorism and Peace Enforcement	

Table 1: Missions of the U.S. Army

Derived from remarks by LTG Kevin P. Byrnes, Assistant Vice Chief of Staff U.S. Army, briefing on Army Transformation, Naval Postgraduate School, Monterey, Calif., 5 June 2000.

⁴⁴ General Eric K. Shinseki, Chief of Staff United States Army, testimony before the Armed Services Committee, United States Senate, 106th Congress, 2nd session, on the Fiscal Year 2001 Budget and Posture of the United States Army, 1 March 2000, available Lexis Nexis (accessed 3 August 2000).

During a presentation at the Naval Postgraduate School in June 2000, LTG Byrnes promoted THE Army, outlined the missions well, and mentioned some of the integration efforts taking place within the Army.⁴⁶ He has been providing General Officer level guidance to integrate the reserve components during transformation to the Objective Force. Unfortunately, the Aviation Modernization plan seems to deviate from the goals of the Objective Force.

Additional emphasis was placed on transformation and modernization of the Army when U.S. Army Chief of Staff General Eric Shinseki announced a plan in October 1999 to shift forces toward lighter, more mobile brigades that are able to respond in days rather than weeks. The Washington Times reported that he wanted the transformation locked in by the end of his four-year tenure in 2003 to prevent a successor from making changes. Under Shinseki's plan, the medium-weight brigades will trade tracks for wheels, the dominant M-1 Abrams tank and Bradley fighting vehicle will be replaced by lighter equipment, and the brigades will be equipped with Future Combat System vehicles (FCS). Aviation, capable of rapid deployment and the maneuverability to destroy mobile, scattered enemy forces, will be an integral part of this future medium force.⁴⁷

The second reason behind the 2000 Army Aviation Modernization Plan was that a number of GAO reports indicated the Army's very expensive modernization priority, the

⁴⁵ LTG Kevin P. Byrnes, Assistant Vice Chief of Staff U.S. Army, briefing on Army Transformation, Naval Postgraduate School, Monterey, Calif., 5 June 2000.

⁴⁶ THE Army refers to the latest terminology referring to a multi-component service. THE Army is synonymous with the Army, total force, and multi-components.

⁴⁷ Ron Laurenzo, "Army Vice Chief Promises Aviation Blueprint," *Defense Week*, 18 January 2000, available Lexis Nexis (accessed 27 July 2000).

RAH-66, Comanche, was in trouble.⁴⁸ The GAO was concerned that the DOD acquisition oversight and review process was approving a program development and production plan that contained significant cost, schedule, and performance risks. GAO analysts further noted that the National Guard was not funded to receive modernized aircraft concurrent with the Active Component. As early as 1994, the GAO reported that the Army's decision to proceed with the Comanche program was being financed at the expense of legacy fleet modernization.⁴⁹

The third factor leading to the development of the 2000 Army Aviation Modernization Plan was the deployment of an aviation task force to Albania, which ended up as a tactical disaster for Army aviation. American aviators and support crews were ordered to Tirana, Albania on 3 April 1999, as an element of the 5,500-member organization named "Task Force Hawk." Brigadier General (P) Richard Cody was assigned as Deputy Commander of Task Force Hawk because of his extensive combat aviation experience.⁵⁰ This contingent was part of NATO's operation, "Allied Force." The first 2,000 troops were mobilized from the V Corps in Germany. Two attack helicopter battalions (24 airframes) of AH-64 Apaches, a general support aviation battalion with approximately 26 UH-60 Black Hawks, CH-47 Chinooks and 400 soldiers,

⁴⁸ Louis J. Rodrigues, "Defense Acquisitions-Comanche Program Cost, Schedule, and Performance Status", GAO Report # GAO/NSIAD-99-146, GAO U.S. (Washington, D.C.: General Accounting Office, 24 August 1999), available Lexis Nexis (accessed 27 July 2000).

⁴⁹ "Official Launch of New Phase \$3.1 Billion RAH-66 Comanche EMD Contract Signed," Boeing Helicopters, available Internet: <http://www.boeing.com/news/releases/2000/news_release_000601o.htm> 1 June 2000, (accessed 20 July 2000).

⁵⁰ Sean Naylor, "Sidelined, How America Won a War Without the U.S. Army," *Army Times*, Vol. 59 No. 49, 1999. Available Internet: <<http://www.militarycity.com/features/army/hawk/hawk1.html>>, accessed 24 July 2000.

comprised the aviation piece of Task Force Hawk.⁵¹ The airframes were in good company with about 465 personnel from both the 2nd and 6th Cavalry Squadrons of the 6th Cavalry Regiment. The V Corps commander, Lieutenant General John Hendrix, briefed his soldiers early in the deployment process that their role was a peace enforcement operation, not a peacekeeping mission. The world's premier attack helicopter, valued at more than \$14.5 million per copy and with extremely high operation and maintenance costs, was expected to perform. This was one of the high priority "First to Fight" units that received precedence for funding because of their inclusion in the war plans, yet they lacked the necessary experience, personnel and equipment to perform the mission.

Political and military leaders were surprised by the after action reports on Task Force Hawk. Two Apache helicopters were destroyed in crashes during mission training. The crash on 5 May 1999 claimed the lives of Chief Warrant Officer 3 David Gibbs and Chief Warrant Officer 2 Kevin Reichert. Both were members of the 11th Aviation Regiment's C Troop, 6th Squadron, 6th U.S. Cavalry, from Illesheim, Germany.

General Cody commented on his experiences in a private e-mail, titled "Task Force Hawk Issues/Lessons Learned," sent to several senior aviation officers on June 9th, 1999. He also wrote a memorandum to General Shinseki. General Cody criticized the 1993 ARI for many of the staff and command problems he was contending with as Deputy Commander of Task Force Hawk. His memo went on to highlight several problems exposed by Task Force Hawk's deployment, including: (1) A shortage of Apache pilots; (2) inexperienced Apache pilots and commanders; (3) helicopter units that

⁵¹ Sean Naylor, "Apache Task Force Deploys to Albania," *Army Times*, Volume 59, No. 38, 1999, pp. 8.

lacked state-of-the-art night-vision equipment, radios and fuel tanks; and, (4) an aviation force structure that forces units to "rob Peter to pay Paul." The memo was intercepted, and eventually gathered enough interest to spur a hearing before the Military Readiness Subcommittee of the House Armed Services Committee on 1 July 1999.⁵²

Congressional concerns included: pilot shortages, pilot proficiency, unit combat training, communications equipment, aircraft survivability equipment and force structure for our "come as you are" Army. The committee members' pointed questions identified pilot shortages, even though the Task Force's unit status report indicated its members were fully capable of performing their wartime mission before departing Germany. The platoon and company-level commissioned officers did not have adequate Pilot in Command experience to lead this sort of high profile, high-risk mission. Out of all the Apache pilots, 65 percent had less than 500 hours flight time and none was current from the gunner's station using night vision goggles.

General Cody stated that he wrote his email memorandum:

"To promote professional discussion and a comprehensive review of where we are in aviation today. Aviation posture is a result of many years of declining resources and resource constraints in terms of funding for training and equipment. These reduced resources come at a time when our mission load has increased over 300 percent."⁵³

He went on to state that an increase in funding was critical to ensure current and future aviation capabilities.

⁵² Brigadier General Richard Cody, "Readiness of the Army AH-64 Apache Helicopter Fleet," Statement to the House Armed Services Committee, Military Readiness Subcommittee, 106th Congress, 1st session, Washington, D.C., 1 July 1999, H.A.S.C. 106-18, available Internet: <http://www.fas.org/man/congress/1999/has182030_0.htm>, accessed 9 September 2000.

⁵³ Ibid.

Representative Herbert Bateman, Chairman of the House Military Readiness Subcommittee, pointed out that he had not learned of these issues through proper military channels, as he would have preferred. Information about these critical aviation modernization issues came to him through General Cody's personal correspondence as represented by the media. Representative Don Sherwood of Pennsylvania commented about the budget shortages mentioned by General Cody: "It is our job to see that you have resources to do your job. What bothers me is whose job it is to see that we are told what you need. We are always trying to worm out of a man in uniform what he needs to do the job." Representative Sherwood went on to discuss a \$5 billion funding issue that was brought before the committee in a previous hearing. He commented that to get budget information from the Chairman and the Chiefs of Staff, "it had to be drug out of those folks. It was a painful hearing that day. I couldn't believe what was going on."⁵⁴

Readiness is linked to modernization, operations, maintenance, leadership, equipment, and training. A "come-as-you-are" war means the Army is expected to deploy in a reasonable amount of time with an adequate number of people and suitable equipment to provide the political leverage policy makers require to compel friends, allies and foes of the U.S. government to our will. Task Force Hawk was not effective in this endeavor and Congress wanted to know why.

Other difficulties plagued the National Guard while Task Force Hawk drew attention to the forces in Albania. Guard modernization was impeded by fourteen years of reduced funding, and lack of modernization, integration and interoperability wrought by

⁵⁴ Ibid.

the 1993 Aviation Restructuring Initiative, which deeply gouged the Guard, but had little effect on the AC. Guard modernization was not a priority for the AC under ARI. The modernization level in the ARNG varies: most units are funded for a maximum readiness level of C3 (for simplicity, C3 may be defined as 80 percent ready to do an assigned mission). Other organizations, though, have a legacy fleet of grounded helicopters supported by a large number of restless, discontented National Guardsmen waiting to hear if and when they will be able to contribute again.

As shown by the case of Task Force Hawk, the "singular most prepared units" were not prepared to execute the mission as expected. Units with less funding and cascaded equipment could not be expected to perform any better in a similar situation, nor would ARNG soldiers be able to augment the AC equipment.

Senior level officials did not effectively communicate the state of aviation readiness to Congress. Legislators who could have helped the aviation units integrate and modernize with additional funds were ill informed of the aviation posture. Testimony to the House Military Readiness subcommittee demonstrates that the Chairman, Mr. Bateman, found it necessary to ask probing questions to determine current resource levels. Mr. Bateman asked General Cody about problems with night vision devices:

"Is that condition still present? Are we seeking to do anything about it? Can we anticipate? Should we be expecting the Army to request us for procurement action or authority to correct any equipment deficiencies in Apaches? If you don't have systems that technology has made available but we haven't authorized or funded it, I would hope your leadership is going to ask us for it, and if they don't we are willing to take some initiative as long as we understand the need.... Is there any other equipment you need?"⁵⁵

After explaining his and the chairman's frustration trying to get technological improvements and upgrades fielded, Rep. Duncan Hunter of California continued:

"So, I would ask you for the record to review the items that we have enumerated that you need, with any recommendations that you can make as to whether or not the fielding of these items can be accelerated. You have given us some dates and some acquisition tracks. Can we accelerate the fielding of any of these items, and if so, how do we accelerate it?"⁵⁶

Chairman Bateman reiterated:

"Let me sort of echo the thrust of what you just asked. We have asked you a number of questions today, and you have given us good answers, and I am not complaining about the answers you have given us. But they are ad hoc, sort of off the cuff, spontaneously reacting extemporaneously. General Cody particularly, and Colonel Hunter, Colonel Bramblett, I would like for you to scrub this memorandum, each of the items in it, and then address the needs, make sure that we have an inventory, a laundry list of the items where material resources, funding, programs can make you more ready, make an already magnificent force an improved and enhanced force, because, again, that is the very purpose and the reason for the hearing."⁵⁷

Not long after this hearing, the 2000 Army Aviation Modernization Plan was developed to address many of these issues.

⁵⁵ Ibid.

⁵⁶ Ibid.

⁵⁷ Ibid.

Finally, grounding of the ARNG legacy fleet and many of the modernized airframes in 1999 raised additional concerns. During the ARI and draw down, leaders did little to modernize and integrate the ARNG. The grounding of the UH-1 and AH-1 fleet in 1999 merely forced a decision when the inclination to retire the fleet was already being considered as an option to fund modernization. The UH-1 was supposed to remain in the inventory past 2020. The Army had to accelerate its plans to divest the legacy fleet before the completion of the 2000 Modernization Plan because of the grounding of the Bell T53 Honeywell engine. As of 18 January 2000, 602 of the 1,018 UH-1s had undergone inspections of critical engine parts; 369 of the 602 Huey helicopters failed the inspection because of engine parts fatigue. The Cobra also has the T53 Honeywell engine. Fixing the engines in either airframe would have been extremely expensive because parts were not readily available, and funds for the repair of the legacy fleet were short. Options had to be considered; yet, few steps were taken by the Army to use this as a catalyst toward an integrated Total Force. Rather than integration, investment was directed into the premier reconnaissance and attack helicopter, the RAH-66 Comanche, and for funds to upgrade the aging AH-64A. A decision was made to divest the legacy UH-1 aircraft by 2004 and to ground the AH-1 immediately and permanently.⁵⁸

In this chapter, I argued that four primary motivators evident in 1999 ushered in the development of the 2000 Army Aviation Modernization Plan. First, the senior leadership insisted upon integration and interoperability in their transformation and

⁵⁸ Consideration was given to the Light Utility Helicopter (LUH). The LUH would leave the Guard with a new aircraft, but one that was unique to the Guard system, had no survivability equipment and only a 20-year life cycle. The Army decided upon the UH-60 as its sole Objective Force utility helicopter rather than procuring the LUH. Interagency

modernization endeavors. Secondly, Task Force Hawk spurred a great deal of interest in aviation modernization. Thirdly, the GAO reported unfavorably on the RAH-66 procurement management. Finally, modernization concerns were raised because of the many fleet-wide groundings in 1999.

agreements between the states were also considered to bridge the gap of the utility helicopter deficiency in the Guard. Guard officials deemed this plan a band aid-at best.

IV. ANALYSIS OF THE 2000 ARMY AVIATION MODERNIZATION PLAN

The 2000 Army Aviation Modernization Plan is founded upon three objectives:

- (1) Full spectrum capability;
- (2) Strategic responsiveness;
- (3) Focused research, development and acquisition

The full spectrum capability objective derives from a need to respond to anything from a humanitarian mission or domestic disaster relief to two major regional conflicts as outlined in the National Military Strategy. Strategic responsiveness refers to the ability to travel to the scene: "To get there firstest with the mostest." Focused research, development, and acquisition mean to get the most for our money in support of where we are heading in the "global era." Packages must be upgradeable, maintainable, and sustainable over time and in a variety of environmental conditions.

I begin the analysis of the 2000 Army Aviation Modernization Plan by scrutinizing the outlined goals and objectives. I then demonstrate that the five assumptions of the plan are unrealistic and unattainable with current resources. The next part of the chapter is divided into four sections and a summary. Section A analyzes the Multi-functional Battalion, which is the basic organizational reform associated with the 2000 Army Aviation Modernization Plan. I argue that one aspect of the Multi-functional Battalion is beneficial, and explain why four other aspects of it are hindrances to integration and interoperability. I identify two of the major findings of the thesis in this section. First, the component leaders are surmounting cultural obstructions to integration

and interoperability through cooperative planning and coordination. Second, the Multifunctional Battalion plan does not fully support the needs of ARNG dual mission requirements. A second Utility Helicopter battalion must be fielded to the ARNG Division Aviation Brigades to satisfy the increasing number of dual mission requirements.

Section B describes the new plans associated with the major airframe types. The airframes are analyzed as: Attack, Utility, Cargo, and Reconnaissance Attack helicopters. The 2000 Army Aviation Modernization Plan recommends various upgrades, recapitalization, and procurement programs. This section examines the primary programs associated with these airframes in the near-, mid- and long-term. Improvements and hindrances to integration and interoperability are described for each type of aircraft. The huge cost of the Comanche program has hindered integration and interoperability of the components throughout the 1990s and is likely to do so through the mid-term. This program consumes an ever-increasing share of the budget as more of the airframes are fielded to the AC through the long-term. The program serves to modernize the AC, but does nothing to integrate the ARNG through FY2013. Many alternatives to this program would enhance integration and interoperability; yet still provide a full spectrum combat aviation force.

Section C of this chapter argues the importance of simulation. Training Aids, Devices, Simulators, and Simulation (TADSS) have concurrency issues now, and the 2000 Army Aviation Modernization Plan does little to ensure the integration and interoperability of these devices as the Plan is implemented.

Section D argues that funding of the Plan is inadequate. Furthermore, the Guard will pay the price for almost all fielding delays, procurement problems, and displaced equipment recapitalization issues. Many programs have been agreed upon since the spring of 2000 without funding authorization. Failure to include the 2000 Army Aviation Modernization Plan in the budget cycle is the third negative finding in the analysis.

Section E summarizes the plan. The Multi-functional Battalion and the various aircraft, simulator and funding issues mentioned in the previous sections prove that integration and interoperability problems will result if Army aviation modernizes as the plan proposes. Overall funding shortages, utility helicopter shortages in the RC division aviation brigade and Comanche program costs are major areas of concern.

Finally, I argue that five key assumptions made in the formulation of the 2000 Army Aviation Modernization Plan are unrealistic and detrimental to integration and interoperability of the Army National Guard: (1) Comanche will be fielded on schedule as outlined in the procurement program; (2) Army aviation will have a 4-helicopter fleet with the TH-67 not counted (RAH-66, AH-64D, UH-60 and CH-47); (3) program funding will procure modernized aircraft for all aviation units; (4) Army Ground Support Equipment and Test Measurement and Diagnostic Equipment will be funded; and, (5) Global Combat Service Support will not be realized by the time this plan is implemented.

Two of these assumptions are major hindrances to integration and interoperability. First, the RAH-66 is not likely to be fielded on schedule. Even in the unlikely event it is on schedule, there are no benefits to integration and interoperability through FY2018. Secondly, it is unrealistic to assume funding will procure aircraft for all aviation units

when many aspects of the plan have not been incorporated into either the 01-05 POM or the 02-07 POM cycles. Resources for all aspects of the plan have been neither identified nor funded.

A. THE MULTI-FUNCTIONAL BATTALION

In this section, I analyze how the Multi-functional Battalion (MFB) affects integration and interoperability. This section and the subsequent sections of this chapter utilize a timeline: near-term--FY00-01; mid-term--FY02-07; and long-term--FY08-18. I then analyze how the 2000 Army Aviation Modernization Plan both improves and hinders integration and interoperability. In this section, I argue that a few minor and two major integration and interoperability issues are related to MFB plans.

First, the theory and organizational structure of the MFB could conceivably improve integration and interoperability, but the reality of the plan is that many ARNG units are without flyable aircraft, current aircrews, and support personnel through much of the mid-term. One major factor indicating improvements in integration and interoperability is that multi-component leaders are working well together. Cooperative planning is enhancing efforts to modernize. Component relationships are improving and as a result, more viable solutions to fielding problems are being discussed, with less risk to the ARNG. Recapitalization, upgrades, and fielding issues, however, complicate the plan. A clear and concise fielding plan, funding plan, and timeline are not available.

An MFB reorganizes the current single aircraft ARI battalion into a unit comprised of three primary types of aircraft. The MFB manned at 100 percent allowable level of organization will comprise one ten-helicopter company of Sikorsky (UTX) RAH-66 Comanches, one ten-helicopter company of Boeing AH-64D Apaches, and a third ten-helicopter company of Sikorsky UH-60M Blackhawks.⁵⁹ All Army divisions will have

⁵⁹ "2000 Army Aviation Modernization Plan," p. 14.

two MFBs with the exception of the 101st Airborne Division. In addition, the divisions will have a cavalry troop of Comanche helicopters assigned to help fill attack and reconnaissance roles. The MFB, combined with an unmanned aerial vehicle company, headquarters and maintenance formations will comprise the Division Aviation Brigade.

Although the Guard MTOEs have not yet been developed, according to one Guard officer, MFBs are expected to begin fielding in 2002, and the Army expects the transformation of ARNG aviation brigades to be completed by 2004.⁶⁰

The benefits of this plan, called the "Way Ahead" plan, as outlined in the 2000 Army Aviation Modernization Plan, are:

(1) The Multi-functional Battalion has a design that supports major theatre war, small-scale contingencies, and stability and support operations. Rather than assemble an aviation task force to support a non-divisional deployment, the MFB under the "Way Ahead" plan has an adequate variety of airframes, staff, and support personnel to deploy for missions other than major theatre war with modular companies.

(2) MFBs are designed for more rapid deployment than the ARI battalions. In addition, they can be tailored and sustained for the full spectrum of missions.

(3) The staff is more robust in the MFB, with enough redundancy to complete split-base operations for short periods and to provide 24-hour operations.

(4) Units are organized in a manner similar to their deployment organization. Under ARI battalion structure, a task force is formed if more than one type of aircraft is necessary.

⁶⁰ Marc Strass, "Army to Field Units Under Objective Strength to Fund Aviation Modernization," *Defense Daily* Vol. 206, No. 3, 5 April 2000, pp. 1-3.

(5) The organization is more adaptable for small-scale contingencies, stability and support operations, joint, combined, coalition and integrated operations if compatible equipment is fielded

According to the 2000 Army Aviation Modernization Plan, both the MFB and the divisional aviation support battalion can detach a company-size, task force-like element. The company-sized element can perform autonomous operations at a distant location. These split elements allegedly can sustain themselves after entry into the operational theater.

Schematics of the MFB composite companies, Objective Force Divisional Aviation Brigade structures, the Total Army Aviation 2005 organizational structure and a complete list of the Corps Teaming assignments appear in Appendix A. The teaming assignments are an Army-wide integration effort.⁶¹

1. Timeline for the MFB

In the near-term (FY00-01), senior aviation planners and force development staffs are diligently planning for transition to the Multi-functional Battalion structure. The planning is well integrated between components, with the first MFB coming online in the mid-term (FY02). A major finding of this thesis is that the efforts of these officers to cooperate in the administration of the 2000 Army Aviation Modernization Plan is going to improve component integration and interoperability beyond the scope of the written document. Two conferences that support this conclusion took place in August of 2000 (August 17th in the Pentagon, and August 23rd and 24th at the USAAVNC, Fort Rucker,

⁶¹ Speech by General Eric K. Shinseki, Chief of Staff of the Army, 122nd NGAUS General Conference, Atlantic City, N.J., 14 September 2000.

Ala). Both of these conferences included representatives of the National Guard, Reserves, and Active Component.

The first conference, on 17 August, was held to brief Lieutenant General Larry R. Ellis, the Deputy Chief of Staff, Operations (DCSOPS), on modernization plan recommendations.⁶² The second conference, on 23 and 24 August, brought together an integrated staff-working group to plan the funding and transition from the current ARI force to the Objective Force.⁶³

The MTOE that supports the induction of these systems into the ARNG should be completed in FY01.⁶⁴ Completion of the MTOE is very important to the ARNG because of the monumental impact these changes will have on traditional active duty Guard and civilian support personnel. Completion of the MTOE also is necessary for the analysis of funding requirements. In the mid-term (FY02-07), the sixteen MFBs and the additional Corps assets should be completed by FY04.⁶⁵ Integration and interoperability will be difficult during the mid-term for four reasons. First, equipment-fielding requirements are not fully identified or funded. Second, the plans are based on the Comanche arriving on time, but numerous sources indicate that is unlikely. Third, this plan leaves the ARNG

⁶² UH-60As cascading to the ARNG will be fielded to a minimum ALO of 60 percent. Some units that have a higher priority (like the 40th Division and the 49th Division) will have higher levels of fill than 60 percent. Some units may be filled to 100 percent, but the minimum for any lift unit in the ARNG will be 60 percent.

⁶³ Three adjustments to the 2000 Army Aviation Modernization Plan were confirmed at this second meeting. First, the UH-60 authorization for the Army National Guard will be at 80 percent rather than 60 percent. Secondly, Cavalry units will receive some OH-58D aircraft during the mid-term until the AH-64A or RAH-66 is cascaded to them. Finally, one National Guard official stated on the record that he has received a commitment for at least three battalions of AH-64Ds rather than AH-64As. Although funding, planning information or written commitments cannot be found to identify this change, integration and interoperability will certainly be improved if the plans comes to fruition.

⁶⁴ Interview with MAJ Paul Kelly, National Guard Force Development, 24 August 2000, Fort Rucker, Ala.

⁶⁵ Interview with COL George J. Gluski, Assistant Commandant, 24 August 2000, USAAVNC Fort Rucker Ala.

MFB with a hollow structure. The hollow structure and lack of interoperability between legacy and modern airframes, as well as incompatibility between different models of the same type of aircraft, hinder any integration and interoperability between the Active Component Army and Army National Guard as the MFB is fielded through the mid-term. Finally, the geographic separation of units will be another integration problem.

The ARNG Attack Battalions are funded at only 23 percent of their Objective Force requirements until FY2015. The cavalry squadron will be funded at 66 percent of the Objective Force requirement.⁶⁶ As the plan is written, ARNG cavalry and attack companies will have organizations of people but few, if any, modernized aircraft. These units are to receive some AH-64As in FY04.⁶⁷

In the long-term (FY08-18), since the MFB structure is to be completed in FY04 (or FY09, according to some), the hollow ARNG battalions and squadrons will receive cascaded equipment as the Comanche is fielded.⁶⁸ The AH-64A is to be cascaded and the OH-58 retired by FY13. The cascade of equipment will continue while the Comanche is produced at a maximum level of 72 per year beginning after FY08. The 2000 Army Aviation Modernization Plan projects that transition to the Objective Force by the ARNG will be completed by FY18, under optimum conditions with no losses, delays or changes to the RAH-66 program or other related and subsequent programs. The AC will complete

⁶⁶ "2000 Army Aviation Modernization Plan," p. 22.

⁶⁷ Also during the mid term, the 3 armored cavalry regiments (ACRs) will be equipped with 10 UH-60s and 10 OH-58Ds for each of three Troops. Two of the ACRs are AC and one ARNG. Comanche fielding begins in FY06 and the first of the Cavalry Squadrons is planned to stand up in FY08. Ramp up of Comanche production to 72 per year will begin a process that eliminates the OH-58D from the force structure in FY13 and supports the cascade of equipment to ARNG divisions. Marc Strass, "Cobras to Leave National Guard by October, Won't be Replaced Until FY04," *Defense Daily*, Vol. 205, No. 57, 27 March 2000, pp. 1-3.

⁶⁸ *Ibid.*

its transition by FY15 when the attack and reconnaissance units are filled to 100 percent.⁶⁹

2. Improvements of Integration and Interoperability

Cooperative planning for modernization of the components is a major improvement over the methods of the past. Cultural barriers to integration are being overcome by many of the aviation planners. This multi-component effort will certainly help in addressing follow-on issues, and set a new standard for future modernization and integration efforts.

One National Guard official, voicing what may be a representative opinion, feels that any modernization is better than none.⁷⁰ Many of the Guard's UH-1s and all its AH-1s are sitting on the ground. If aviators can keep flying with another legacy aircraft until modern aircraft are fielded, that is better for the Army than having up to 50 percent of its fleet grounded. In FY2018, the structure will provide relevancy to units that have not been included in the Warfight since the 1980s.

3. Hindrances to Integration and Interoperability

Four primary hindrances to modernization have been identified in this section and one is a major finding for this thesis. First, funding for the multi-functional battalion and 2000 Army Aviation Modernization Plan is vague. Second, ARNG aviation is at risk in the near-, mid- and long-term, until modern airframes are cascaded. This cascade of equipment is based on the fielding of the extremely expensive Comanche on schedule.

⁶⁹ Ibid.

⁷⁰ Interview with Ronald Briones, Army National Guard Aviation Resource Manager, 21 September 2000, Jefferson Plaza, Arlington, Virginia.

Third, cascading of aircraft to the MFB structure may leave the AC and ARNG still not integrated, although each component would have newer model aircraft. Finally, having the second Blackhawk Company augment the AC division aviation brigade leaves the ARNG desperately short of utility helicopter assets.

Funding for transition to the MFB structure is not clearly identified, according to National Guard officials. The 2000 Army Aviation Modernization Plan itself is an epic alteration to Army aviation, yet the proposals identified in the plan and subsequent to the plan's approval have not been funded. The entire Modernization Plan has not been paid for in the 01-05 POM or the 02-07 POM. Changes can be made to the 02-07 POM through the 03-07 mini-POM; however, funding must be allocated at least a year in advance of the MTOE's development.

The Modernization Plan has been fielded quickly and continues to evolve through intensive management, but funding for these changes is caught up in bureaucracy. Although the MFB structure is similar to the H series MTOE of the 1980s, there are many equipment-fielding issues not identified. As we attempt to modernize at a rapid pace, it is important to consider our history of modernization. Under ARI, the Guard was supposed to make the transition from the UH-1M to the AH-1S and subsequently to the AH-1F in a short period of time; in the event, the process took eight years. Funding for the MFB transformation, therefore, is speculative. The required resources have not been identified. As of 21 August 2000, the MTOE for the Guard MFB had not been developed, nor had the financial needs been thoroughly identified. Although the plan promises to improve the integration and interoperability of our units, the funding to support the decisions is not yet

in place. While the ARNG is trying to make do with a few modernized or legacy aircraft in the mid-term, it runs the risk of having its plans stretched or delayed. The perishable skills of the ARNG aviation force will continue to deteriorate until it receives modern equipment and an adequate budget.

Second, modernization of the ARNG is based on the assumption that the Comanche will be fielded on time.⁷¹ There are many indications, however, that the RAH-66 will be behind schedule. The aircraft will take an even more sizable share of the aviation budget as it enters the inventory. The Comanche program is very expensive and may be scrutinized when the new administration reviews the National Military Strategy. It may be more combat overmatch than Army aviation can afford. Problems with the RAH-66 program will have a ripple effect through the Army. The ARNG will have only enough aircraft to allow pilots an occasional flight. Pilot and maintainer proficiency in the Guard's MFB will deteriorate with time, as will morale and retention.

Third, modernizing the ARNG after the AC has been modernized does not make the necessary cultural paradigm shift that could overcome the business-as-usual approach to modernizing the ARNG with cast off AC equipment. An option to modernize a proportional level of ARNG and AC units could support integration and interoperability much better than the 2000 Army Aviation Modernization Plan currently proposes to do. Trading modernization for readiness throughout the 1990s has left the ARNG and AC aviation branches non-integrated. Modernization through MFBs that are kept hollow until more resources are available may do nothing more than provide newer aircraft to the non-

⁷¹ "2000 Army Aviation Modernization Plan," p. 3.

integrated and non-interoperable components. The components risk having less integration and interoperability than they currently have.

Finally, the AC Division Aviation Brigade is augmented with two ten-ship UH-60 companies from the Reserve component. The ARNG or Reserves can ill afford the loss of these aircraft. Domestic operations, military support of civilian authorities, weapons of mass destruction plans, counter-terrorism plans and a host of other needs require two Utility companies of UH-60L+, UH-60M or UH-60Q (rather than the UH-60A) in both the ARNG and the AC.⁷²

In summary, we analyzed how the Multi-functional Battalion affects integration and interoperability. This section argued that a few minor and two major integration and interoperability issues are related to the MFB plans. First, the theory and organizational structure of the MFB could conceivably improve integration and interoperability, but the reality of the plan is that many of the ARNG units are unfilled or partially filled through much of the mid-term. A major finding is that aviation leaders are working well together. Cooperative planning is enhancing the multi-component efforts to modernize. The cultural barriers to integration are being crossed and the result is a more workable solution to fielding problems and less risk to the ARNG. Even with identifiable improvements in planning, however, funding for the plan is fuzzy. Secondly,

⁷² The ARNG is filled to 80 percent of its authorized level. Conversion from UH-60A to UH-60L+ at a rate of 60 per year by FY06 is a goal, but the recapitalization program is funded for only 26 conversions per year through FY05. Total Allowable Level of Organization for the ARNG is 80 percent in the Objective Force. The total number of UH-60L+ or UH-60M the ARNG will receive is 32 per multi-functional battalion. During the near-term and mid-term, the Army National Guard has considerably fewer than authorized in the Objective force although officials would not release exact fielding and recapitalization data. The risk to civilians, political leaders, and soldiers is unsatisfactory. The MFB allowable level of organization for the ARNG must be changed to allow the second utility company of the MFB structure to remain with the reserve component. "2000 Army Aviation Modernization Plan," p. 28.

recapitalization, upgrades, and fielding issues complicate the plan. A clear and concise fielding plan and timeline is not available. Finally, the second of the two major findings in this section is that the second utility company in the reserve component division MFB must not be deployed to augment the AC. Doing so leaves the Guard with inadequate assets to handle dual mission requirements.

B. THE AIRCRAFT

1. Attack Aircraft (AH-1 Cobra OH-58D and AH-64)

The AH-1 Cobra is to remain grounded indefinitely. Under the 2000 Army Aviation Modernization Plan, the AC cascades older AH-64A to the ARNG as they are replaced by the AH-64D Longbow (one Guard official mentioned a recent commitment to provide the ARNG with three battalions of AH-64Ds rather than the AH-64A model).⁷³

The OH-58D Kiowa Warrior will be the only armed reconnaissance and light-attack helicopter until replaced by the Comanche, according to the 2000 Army Aviation Modernization Plan. Although the RAH-66 is to replace these 387 helicopters by FY13, the plan does not specify the disposition of the airframes. An agreement apparently was

⁷³ Keeping the AH-1 flying through the near and mid-term has some merit according the Army National Guard AH-1 program manager for three reasons. First, divesting the legacy AH-1 immediately leaves organizational structure in the Guard with no aircraft to fly. It also leaves a hollow shell of a unit awaiting a modernized airframe. Soldiers that were recruited and trained to expect challenging, professional and complex duty will now be asked to train in a new Military Occupational Specialty and perform aviation duties on a few legacy aircraft. Readiness, proficiency, and morale quickly decline in circumstances such as these. Secondly, the AH-1 is a formidable flight weapons system. The AH-1 has been upgraded in the Guard many times since the AC cascaded the airframe under the Aviation Restructuring Initiative. The AC may be unaware of ARNG capabilities when considering the AH-1. One company of each Attack Battalion has been upgraded to C-NITE capability for 76 C-NITEs. Other modifications like the TOW 2A and TOW 2B upgrade have enhanced the Guard airframes. Another reason to consider not retiring the AH-1 immediately is aviator proficiency. Presently there is no clear method of training and providing adequate flight time for ARNG aircrews. Repairing enough of the Cobras to retain crews and provide them with flight training may be less expensive and more productive than a Material Transfer Plan and Displaced Equipment Training Plan for OH-58Cs or OH-58Ds that benefits neither the AC nor Guard. Interview with Mike Fitzpatrick, NGB-ARO Aircraft Equipment Specialist (AH-1), 22 August 2000, National Guard Readiness Center, Washington, D.C.

reached to move some of them to ARNG cavalry units in the mid-term, until the RAH-66 is fielded. Two hundred seventy aircraft are funded for a Safety Enhancement Program (SEP) in progress. Unfunded requirements include 43 airframe safety enhancements and procurement of engine inlet filters for an unidentified number of OH-58Ds. The 2000 Army Aviation Modernization Plan claims these issues are addressed in the 02-07 POM. The Plan, however, does not state which component receives aircraft with the SEP and what the risks are to air crewmen in aircraft without the SEP.

The AH-64 program is the most complex of the recapitalization and upgrade options. It is also the most expensive aircraft to operate according to 1999 cost effectiveness data. Figure 1 compares operating costs of each type of aircraft per hour. This data suggests that the operation and maintenance (O&M) costs for the Apache are significantly higher than the AH-1 in the National Guard under ARI. O&M cost increases, along with the upgrades, safety enhancements and recapitalizations for the Apache, are considerable. Exact funding requirements have not been identified.

There are two AH-64 programs underway. First is an AH-64A to AH-64D upgrade. The 2000 Aviation Modernization Plan intends to upgrade all AH-64A to the D configuration, but not all upgrades are funded. A cost of approximately \$3.5 million dollars apiece (a U.S. Army contract valued at \$1.9 billion) was originally planned for 530 of these aircraft in the 01-05 POM.⁷⁴ Because of numerous outstanding safety enhancement issues, 29 of the upgrades needed to be traded off to fund the 24 open, monitored and crossover hazards associated with the AH-64A and the AH-64D. Current

⁷⁴ Jane's Online, "Boeing (McDonnell Douglas) Apache Upgrades," available Internet: <http://fore.thomson.com/janes/psre...&NS_template_dir=&NS_initial_frm=1>, 1 June 2000, accessed 20 July 2000.

funding is dedicated for 501 of the 742 Apaches in the Army inventory. The funding for 29 of the other AH-64A upgrades has been redirected to fix the 24 identified hazards. Funding for the Apache program is exceedingly ambiguous.

The second version of the AH-64D upgrade does not include the fire control radar (FCR). This AH-64D does not receive the Radar Frequency Interferometer or the improved engines. Two hundred forty AH-64As are going to be cascaded to the National Guard. One Guard official, as noted already, has stated that plans now include the cascading of three battalions of AH-64Ds to the ARNG.

Of the 742 Apaches currently in the fleet, 501 are funded for Longbow recapitalization. Six hundred AH-64 Longbows are required in the Objective Force.

a. Timeline

In the near-term, the AH-1 is to be divested. This retirement is enabled by providing legacy OH-58Cs to the ARNG divisional attack and cavalry units presumably to maintain aviator proficiency. Guard officials have stated that the Army will field some OH-58Ds to the ARNG divisional cavalry. It is not clear if this will occur in the near-term or the mid-term. In addition, the OH-58D SEP will complete 177 improvements by the end of FY01. The SEP continues into the mid-term.

FY00 Army and Army National Guard Helicopter Total Cost per Hour

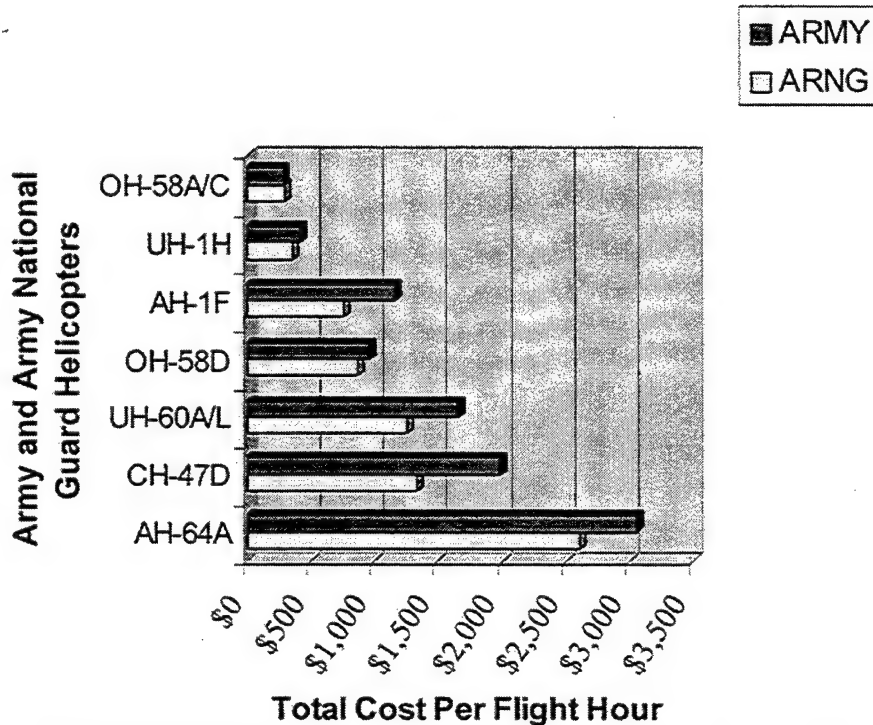


Figure 1: Army and Army National Guard Helicopter Total Cost Per Hour.⁷⁵

In the mid-term (FY02-07), ARNG divisions will be modernized with AH-64As, but funded at 80 percent in the utility units and 23 percent in attack and cavalry attack units. An additional 93 OH-58D Kiowa Warriors are to receive the SEP by the end of FY05. The 2000 Army Aviation Modernization Plan states that a Live Fire Test and Evaluation was initiated at the direction of the Office of the Secretary of Defense, and

⁷⁵ Statistics provided by Programs Integration Branch, NGB-AVN-IR, by email 15 November 2000.

will be completed by FY03. The purpose is to demonstrate the survivability characteristics and to improve operational characteristics of the aircraft.⁷⁶

In the long-term (FY08-18), the attack and reconnaissance units of the division aviation brigades will meet Objective Force requirements in FY15. The ARNG will meet objective force requirements in FY18 if the Comanche program and subsequent equipment cascades and lateral moves are on time and funded. As the RAH-66 is fielded at up to 72 per year after 2008, AH-64Ds will be cascaded to bring Corps RC attack structure up and to improve the ARNG division attack structure.

b. Improvements of Integration and Interoperability

Three primary improvements can be found when reviewing the attack helicopter modernization plans. First, any modernization is better than having a fleet of helicopters on the ground. Second, negotiations between the three components are leading to compromise solutions that promise better integration and interoperability. Third, there is oversight and interest in AC integration of the ARNG, as well as changing cultural interests. Congressional oversight, the meetings, and coordinating activities of multi-component leaders, and a commitment from senior Army officials to transform and modernize the Army, are promising steps toward making the cultural changes necessary to promote modernization that supports integration and interoperability.

⁷⁶ "2000 Army Aviation Modernization Plan," pp. 20, 27.

c. Hindrances to Integration and Interoperability

This section identifies two hindrances to integration and interoperability. The first is the effect on personnel, and the second is the complexity of recapitalization, upgrades, and safety enhancements.

First, these modernization decisions will have very important implications for the personnel in the ARNG aviation structure. According to General Walter Stewart (retired), cascading AH-64A to the Guard when the Comanche ramps up writes off the human capital investment that already has been made in the ARNG structure. Funding the AH-1 until the Guard is modernized would keep these soldiers interested, trained and motivated, if modernized airframes are not immediately made available to them. We are sacrificing the greatest strength of our nation's Army aviation force: the people. It will take years to develop a trained, professional pilot in command, maintenance technician, or maintenance test pilot once these human resources are lost. It is much less expensive and time consuming to fund AH-1 repair or purchase modern airframes than to train new pilots.

According to General Stewart, the human capital is worth far more than the cost of an airframe. For a pilot to gain 1,500 hours experience, the *minimum* number of hours many civilian rotary wing aviation insurance companies require for commercial pilot insurance, for example, will take approximately seven years, flying 200 hours per year. Most Army pilots have far less than 1,500 hours today and many fly less than 200

hour per year. Low pilot hours and level of experience was one of the problems identified with Task Force Hawk. Experienced aircrews and maintainers are critical to the Army.

The exceptional experience of the ARNG is being squandered in the 2000 Army Aviation Modernization Plan. ARNG aircrews will be forced to take turns flying the few legacy aircraft available, and good soldiers will leave the Guard in justified disappointment. While ARNG personnel await the cascaded aircraft, the cost to fix the aircraft and to fix the personnel shortages is going to go up, further impeding integration, and interoperability. In addition, this cascading method of modernization sends a message to these soldiers that their component team is second rate. General Shinseki is making a promise for equipment delivery that will have to be honored on someone else's watch. As a new presidential administration comes in, there will be increased bureaucratic competition for funds both inter-service and intra-service, as well as the FY01 Quadrennial Defense Review.⁷⁷

A second hindrance to integration and interoperability because of the modernization plan relates to recapitalization, safety enhancement, and O&M costs. AH-64 program funding requirements for O&M are going to be higher than for the AH-1 in the near-, mid- and long-term. The logistics footprint of the AH-64 is much larger than the OH-58D, therefore we can expect costs to operate and maintain the AH-64s to be

⁷⁷ Telephone interview with General Walter Stewart (retired), 24 September 2000. General Stewart was Commander of the 28th Division, the 28th Aviation Brigade Commander, and an Aviation Maintenance Test Pilot for the Pennsylvania Army National Guard.

higher in both the air cavalry and attack battalions once the Apache is fielded, regardless of model.⁷⁸

In addition to the expensive upgrades, O&M costs and low operational readiness (OR) rate, there are concerns that the upgrades and changes the Army has requested from the aircraft's contractors may have had an adverse impact on the operational capabilities of the aircraft. A recent GAO report indicates two significant operational problems. The 227 AH-64D Longbows equipped with fire control radar are unable to meet their minimum vertical rate of climb (VROC) requirement of 450 feet per minute minimum with a full tank of fuel and 12 Hellfire missiles at 95 degrees Fahrenheit. The non-radar equipped aircraft has a less powerful engine. Even with the improved engine, the 227 FCR equipped Longbows have VROC problems, according to the GAO report.⁷⁹

Many of those interviewed for this paper were unhappy with both the OR rate and future cost expectations for these airframes. This is significant because of the probable increase in maintenance costs and downtime for these helicopters until they are replaced in 2025 and beyond. Task Force Hawk lessons learned highlights a large number of AH-64 issues that affect personnel, equipment, and readiness. There are 128 AH-64As in the ARNG. Beginning November 1999, a devastating series of groundings impaired

⁷⁸ Interview with MAJ Ed McKee, Aviation Systems Branch Program Integration, 21 August 2000, National Guard Readiness Center, Arlington, Virginia.

⁷⁹ The Apache Longbow is not able to transfer targeting data when not in direct line-of-sight. The design and use of fire control radar are complemented with nap of the earth flight for cover and concealment. The ARC-220 radio was to be fielded to only half the force. Funding and developmental problems that include the amount and severity of electrical interference delayed fielding of the remaining procured radios. DOD disagreed with the GAO findings; the GAO, however, did not concur with the DOD rebuttal. "Apache Longbow Weight and Communication Issues," Government Accounting Office Report to the Secretary of Defense, GAO/NSIAD-98-203, September 1998, pp 1-15.

the entire fleet of attack helicopters. The Guard units paid heavily to keep the AC units operational. From December 1999 until 13 March, only 57 of the 128 Army National Guard Apaches regained operational status.⁸⁰

Funding for the plan is difficult to follow because of its complexity. In addition, the AH-64 modernization plan is complicated by ongoing recapitalization, safety enhancements, shortages, and changes, while the ARNG tries to maintain readiness and transition to the Objective Force.

2. Utility (UH-1 and UH-60)

In this section, I provide an overview of the UH-60 program, followed by a timeline that highlights some critical aspects of the Blackhawk modernization efforts. Finally, I discuss improvements and hindrances resulting from the program. I argue that upgrades for the Guard and AC must occur concurrently to improve integration and interoperability. I further demonstrate that the second UH-60 company in the RC Division Aviation Brigade is a critical asset to the RC Division.

The cost for a UH-60 is approximately \$12.8 million per airframe (an upgrade from UH-1H to Huey II costs approximately \$1.8 million). The UH-60 Blackhawk offers dramatic improvements over the UH-1H it replaces in the combat assault role.

⁸⁰ In Operation Desert Storm, the fleet required more than 600 civilian technicians to keep an acceptable operational readiness rate. Now, almost 10 years later, these aircraft are cascading to the ARNG. If the ARNG has the A model and the AC has D models or D models with Longbow radar, the aircrews and maintainers will not be interoperable. The units cannot integrate without an entirely different training base and logistics trail. The cost to upgrade from the A to the D model Apache is approximately \$3,585,000 each, not including the cost of transporting the aircraft and support equipment. By comparison, a T-53 (AH-1) engine costs approximately \$200,000.00 to upgrade. Inheriting an alpha model Apache without an increase in O&M funds and recapitalization funding will hinder integration and interoperability. Sean D. Naylor, "Apaches Make a Slow Return to Action," Army Times.com, 13 March 2000, available by Internet: <<http://www.mco>> accessed 29 June 2000.

The UH-60 fleet will begin to reach its service life goal of 25 years beginning in FY02. The aircraft Service Life Extension Program (SLEP) began in 1999. The program identifies material requirements to correct deficiencies in the airframe and to modernize the mission equipment and avionics so they are viable with Force XXI and the Army After Next. Modernization initiatives include: digital communication systems and navigation suites, enhanced aircraft survivability equipment, increased reliability and maintainability, airframe SLEP and reduced operations and support costs.⁸¹

a. Timeline

In the near term, the inventory includes 1,439 UH-60A/L. 325 of that number are MEDVAC and 66 aircraft are EH-60s. A plan is fully funded to procure 26 UH-60L+ through FY05, thus retiring the UH-1 by FY04. I find that this timeline is going to be difficult to adhere to as proposed in the 2000 Army Aviation Modernization Plan. Furthermore, any deviations to the timeline adversely effect ARNG modernization. The following example demonstrates why the timeline is unrealistic. The Eastern Army Aviation Training Site (Eastern AATS) is a Department of the Army-approved School. The managers are posturing to provide aviators and maintainers the training that will be required in the mid-term to modernize the ARNG. This schoolhouse is eagerly awaiting definitive numbers regarding training requirements. Only after the quota requirements are determined can the Eastern AATS determine if current resourcing is adequate for the

⁸¹ "UH-60 Blackhawk-Military Aircraft," Federation of American Scientists, available Internet: <<http://www.fas.org/man/dod-101/sys/Active Component Army/uh-60.htm>>, accessed 7 September 2000.

anticipated demand. If the demand for training is greater than resources currently allow, the near-term must be used to ramp up the school to meet the OPTEMPO anticipated in the mid-term. Instructor pilots familiar with the local area, enlisted instructors, simulator modifications and lodging are a few of the considerations that must be well thought-out in the near-term to support increased demand in the mid-term and long-term. By 2 November 2000, the Eastern AATS had no clear guidance on how many students to expect as the ARNG modernizes according to the 2000 Army Aviation Modernization Plan. Planning and posturing training resources in the near-term is crucial to mid-term fielding success. This example demonstrates the unlikelihood that UH-60 fielding will happen on schedule.

In the mid-term (FY02-07), UH-60L procurement continues through FY07. The UH-60Q upgrade program is planned to begin in FY02. The highest priority of the UH-60 program is the UH-60L+/M modernization program.⁸² Research, Development and Technical Engineering ends, and UH-60L+/M production begins in FY03.

MFBs also are being formed in this time, and the UH-1 will be retired no later than FY04. The Army's goal is to produce 60 airframes per year by FY06. A UH-60X program is being developed for "high priority" units.

National Guard units in their new multi-functional battalion organizations must be prepared to receive the displaced UH-60As or the UH-60L+/Ms as they arrive. Logistics packages, training packages, and leader training resources have to be paid for

⁸² "2000 Army Aviation Modernization Plan," p. 28.

during this period. Unfinanced requirements like extended range fuel tanks and simulator modifications for the UH-60 program have to be identified. The 2000 Army Aviation Modernization Plan states that the 02-07 POM is intended to support full procurement of 60 UH-60L+/M per year.

In the long-term (FY08-18), an advanced interoperable engine will replace the T700 during this period.⁸³ A replacement aircraft must be considered for the UH-60 in FY15.

b. Improvements of Integration and Interoperability

The retirement of the UH-1 and modernization of the ARNG will increase interoperability and integration of the components with a caveat. Guard units will suffer personnel losses during the mid-term until units are fielded with modernized aircraft.

The Common Engine Program (CEP, previously called the Joint Turbine Advanced Gas Generator Program) will be a welcome component. It will offer better performance and interoperability between the attack and utility helicopters, and will reduce the logistics footprint of both the Attack and Utility logistics train.

c. Hindrances to Integration and Interoperability

There are two possible hindrances to fulfillment of the UH-60 plan. First, the UH-60A and the UH-60L+/M, their crews and their simulators are not interoperable.

⁸³ The engine will apply to both the UH-60 and the AH-64 Apache. Sikorsky claims the UH-60X will offer twice the payload-range, a 24-knot increase in speed and a 50 percent reduction in maintenance costs compared to the 1978 version of the UH-60A. Michael J. Gething with David C. Is and Andrew Koch, "Upgrade Implications of the US Army's Aviation Force Modernization Plan," *Jane's Online*, Vol. 004/009 Ed. 2000, 1 May 2000.

As we make the transition to the Objective Force, exact resource requirements need to be identified and funded to ensure both components can integrate their systems.

Second, the two UH-60 companies in the division aviation brigades are needed in the ARNG. The second company is a critical asset for the ARNG. Other assets are available to the AC, such as the UH-60s at echelons above corps, Alaska, and the 25 UH-60 companies in the corps structure.

In summary, there are a variety of upgrades, enhancements, and procurement programs planned for the UH-60. The CEP engine upgrade is a definite improvement, but two problems arise with the programs. First, the UH-60A, a large number of which are in the ARNG, is not interoperable with the UH-60M, and the funding to complete the upgrades is not fully resourced. Second, the ARNG needs the second UH-60 company in the RC division aviation brigade to deal confidently with dual mission responsibilities.

3. Cargo (CH-47)

In this section, I provide an overview of the CH-47 modernization plan. A timeline follows with an elaboration of a CH-47 upgrade. Delays in recapitalization, enhancements, and upgrades can be expected if upgrade plans are not funded in a timely manner. The resulting delays will impair ARNG and AC integration.

In June 1999, there were 433 CH-47D in the Army inventory. Three hundred and two were scheduled for CH-47F conversions. The cost for the first U.S. Army Multi-year Program upgrade in 1985 was \$1.2 billion for 240 upgrades. Subsequent upgrades cost

\$773 million for 140 in 1989, and \$67 million in 1993 for 11 more CH-47C to CH-47D rebuilds.⁸⁴

Three hundred CH-47Ds of the four hundred thirty one remaining in the fleet are scheduled for a CH-47F upgrade, leaving 131 aircraft as D models. This two part upgrade program includes modification of the T55-L-712 engine to the 714A configuration. This process already is underway and will be completed in FY04. The Improved Cargo Helicopter phase involves remanufacturing the airframe, tuning out vibrations, and improving avionics and cargo handling gear. The program also includes installing elastomeric rotor hubs and providing an air transportability kit. Benefits include greater reliability, reduced O&M costs, reduced pilot workload and more efficient cargo handling.

The purpose of the CH-47F is to bridge a gap until the Joint Transport Rotorcraft (JTR), originally considered as an Aerial Cargo Transport in the 90s after Desert Storm, is brought into service. At the time, the JTR was considered too expensive, but now it will be considered in the FY20 timeframe. It may replace the Army CH-47D, the Navy CH-53E, and the Air Force HH-60G.⁸⁵

a. Timeline

In the near-term (FY00-01), the first part of the CH-47F upgrade, the T55GA714A engine upgrade, is underway. The program is nearly on schedule, although a

⁸⁴ "Boeing 114 and 414," *Jane's All the World's Aircraft 2000-2001*, available Internet: posted 15 June 2000, <http://fore.thomson.com/janes/psre...&NS_template_dir=&NS_initial_firm=1>, accessed 20 July 2000.

⁸⁵ "Joint Transport Rotorcraft (JTR) Aerial Cargo Transport (ACT)," *Federation of American Scientists*, available Internet: <<http://www.fas.org/man/dod-101/sys/Active Component Army/jtr.htm>>, accessed 20 September 2000.

professional group of warrant officer instructor pilots, rather than a centralized integrated managerial group, is leading the modernization effort.⁸⁶

In the mid-term (FY02-07), 11 aircraft are scheduled for CH-47F production in FY02. Full rate schedules in FY04 will be for 27 aircraft. In FY05 and FY06, this rate ramps up to a maximum of 29 CH-47D to CH-47F upgrades per year.

In the long-term (FY08-18), the 2000 Army Aviation Modernization Plan is not clear on which component retains the 131 CH-47D models. It is possible that the ARNG will receive these aircraft without the modifications critical to insure interoperability with the AC. One source indicates that the state adjutants general noted this detail when reviewing the plan. They insisted all the ARNG CH-47D be upgraded to the CH-47F configuration. Funding for this stipulation is vague.⁸⁷

b. Improvements of Integration and Interoperability

Identical airframes in the AC and the ARNG are a desirable aspect of the aviation modernization plan. Approval of the modernization plan from the adjutants general, with the caveat that ARNG CH-47Ds be upgraded as well as AC helicopters, is an improvement over the plan proposal that 131 Guard helicopters be allowed to mature without modernization.

⁸⁶ This plan has progressed in a timely manner due to the initiative of two Army National Guard instructor pilots who put the training program together. FM 100-11, "Force Integration," provides timelines and methods for completing these integrated upgrades. Senior staff leadership involvement in the planning and resourcing of all upgrades, recapitalization and procurements may help to avoid these extemporized efforts to integrate the components and modernize the aviation force. The hazard argued by this example, is that other programs outlined in the 2000 Army Aviation Modernization Plan are not centrally managed or fully funded. Delays in any of the programs have a detrimental effect on integration and interoperability, but affect the Army National Guard more severely than the Active Component Army. E-mail interview with Steven Amsdill, CH-47D Instructor Pilot Eastern AATS, 15 September 2000.

c. Hindrances to Integration and Interoperability

The ambiguity of the 2000 Army Aviation Modernization Plan concerning the 131 helicopters that would not be upgraded to the CH-47F suggests that old equipment again is being cascaded to the ARNG. Future planning must clearly outline the strategy for all three components in a manner that is open and fully encompassing. Failure to plan these projects carefully around the goal of multi-component incorporation hinders integration and interoperability.

Funding of the CH-47F for both the ARNG and the AC will improve integration and interoperability. Managers must be proactive in the upgrade programs to procure funds and effectively address plan complexities.

4. **Reconnaissance Attack Helicopter (RAH-66)**

In this section, I will provide an overview of the RAH-66 Comanche, with a timeline of key events in the fielding plan. I argue that the RAH-66 does little to improve integration of the components until after 2018. A major finding in this section is that because the RAH-66 is so expensive, it consumes an increasing share of modernization funds. In the end, the bill-payer for the Comanche program is the ARNG modernization and integration effort. Because of the expense and fielding plan, the RAH-66 program is likely to be stretched or delayed. I suggest an alternative plan to fund systems that are older and less capable than the Comanche, but that support integration and

⁸⁷ "TAGs OK Army Aircraft Mod Plan with Caveat," *National Guard Association of the United States*, June 2000, Volume 54, No. 6, pp. 14-16, available Internet: <<http://www.ngaus.org>>, accessed 17 August 2000.

interoperability and should be considered as an alternative to all 1,213 Comanche helicopters.⁸⁸

There have been great difficulties and controversy surrounding the procurement of this very expensive aircraft (projected to cost \$48 billion). The Army touts the Comanche as the centerpiece for force modernization.⁸⁹ The RAH-66 has capabilities that are supposed to offset the expenses. These operational claims are being tested and developed concurrently, much to the chagrin of the GAO. According to the 2000 Army Aviation Modernization Plan, the RAH-66 fills a role that no other helicopter, including the Apache, can.

The Boeing-Sikorsky RAH-66 Comanche is the first helicopter developed specifically for the armed reconnaissance helicopter role. The Comanche will provide Army aviation the ability to move into the 21st century with a system that supports the

⁸⁸ The RAH-66 Comanche program, advanced from the Army Aviation Mission Area Analysis (AAMAA) conducted in 1981-1982. This requirement has been reviewed in accordance with today's changing threat and remains valid according to the Active Component Army and Sikorsky. Headquarters, Training and Doctrine Command (TRADOC), approved the Required Operational Capability (ROC) and Operational and Organizational (O&O) Plan on 11 March 1987. On 24 December 1990, TRADOC approved an updated ROC. In anticipation of Milestone II decisions, two LH Cost and Operational Effectiveness Analyses (COEA) were conducted, March 1987 and March 1991. As a result of the 1990 Department of Defense (DoD) Major Aircraft Review (MAR), and approval by the DoD Joint Requirements Oversight Committee (JROC), the Secretary of Defense validated the requirement for RAH-66 Comanche as a replacement for the Army's current light helicopter fleet. "*RAH-66 Comanche*" Federation of American Scientists, available Internet: <[http://www.fas.org/man/dod-101/svs/Active Component Army/rah-66.htm](http://www.fas.org/man/dod-101/svs/Active%20Component%20Army/rah-66.htm)>, accessed October 2000.

⁸⁹ "The Comanche is an armed reconnaissance and light attack helicopter that can perform missions throughout the spectrum of conflict. It is a versatile and agile twin engine (T-801) aircraft with all-composite fuselage, second-generation targeting sensors, and low observable design. The Comanche provides enhanced survivability, maintainability, lethality, and unprecedented situational awareness. Comanche will also provide tactical targeting, prioritization, and enemy information to force commanders at all levels. The Comanche is self-deployable 1,200 nautical miles on one fuel load in ten hours, and is capable of deploying via air transport to any theater within 96 hours. Two RAH-66 prototypes are flying in the Program Definition/Risk Reduction Phase. The current program initiates production in FY04, leading to an Initial Operational Capability (IOC) in December 2006 and a full cavalry squadron fielded by FY08. The recent program restructure, accomplished without increasing program cost or risk, has accelerated the RAH-66 Milestone II by 18 months; from October 2001 to April 2000.... The programs also better supports the field employment of increased capability and quantities of training devices and provides for the use of the Aviation Combined Arms Tactical Trainer—Aviation Reconfigurable Manned Simulator (AVCATT-A)." "The 2000 Army Aviation Modernization Plan," p. 26.

Army after Next. The Comanche is intended to replace the current fleet of AH-1 and OH-58 helicopters in all air cavalry troops and light division attack helicopter battalions, and supplement the AH-64 Apache in heavy division/corps attack helicopter battalions.

The RAH-66 Comanche helicopter's primary role will be to seek out enemy forces and designate targets for the AH-64 Apache attack helicopter in all flight modes. Comanche statistics also indicate unmatched attack and air-to-air capabilities. The helmet has forward-looking infrared (FLIR) images and overlaid symbology that can be used as a heads up display in nape-of-the-earth flight.⁹⁰

The Comanche payload is formidable.⁹¹ In addition, the aircraft incorporates more low-observable stealth features than any aircraft in Army history. The Comanche's head-on radar signature is 360 times smaller than the AH-64 Apache, 250 times less than the smaller OH-58D Kiowa Warrior, and 32 times less than the OH-58D's mast-mounted sight, as shown below in Figure 2.

⁹⁰ "RAH-66 Comanche."

⁹¹ The armament subsystems consist of the XM301 20mm cannon, and up to 14 Hellfire anti-tank missiles, 28 Air-to-Air Stinger (ATAS) anti-aircraft missiles, or 56 2.75 inch Hydra 70 air-to-ground rockets carried internally and externally. Up to four Hellfire and two Air-to-Air Stinger (ATAS) missiles can be stowed in fully retractable weapons bays and the gun can be rotated to a stowed position when not in use. This design feature reduces both drag and radar signature. Ibid.













Type of Detection	OH-58D	RAH-66	AH-64
• Radar Front Sector 10 GHz/Hz	 203X 32X	 X	 683X
• Infrared Radar Side Sector Source Signature No Solar Load Stinger	 1.16X	 X	 2.75X
• Acoustic Front Sector Moderate Ambient	 1.1X	 X	 1.6X
• Visual Front Sector Unaided Eye Terrain Background Sector Search	 1.2X	 X	 1.0X

Figure 2: Comanche Stealth features⁹²

⁹² Figure derived from Federation of American Scientists web page, "RAH-66 Comanche", Available Internet: <http://www.fas.org/man/dod-101/sys/Active/Component/Army/rah-66.htm>, Accessed October 9, 2000.

a. Timeline

In the near-term, the Comanche program formally began its Engineering and Manufacturing Development phase at a 1 June ceremony at the U.S. Army Aviation and Missile Command headquarters in Huntsville, Alabama. The Army, Boeing and Sikorsky signed a \$3.1 billion engineering and manufacturing contract that recommended acquisition of 1,213 Comanche aircraft valued at between \$34 and \$48 billion.⁹³

In the mid-term (FY02-07), initial production is scheduled to begin in FY04. Initial operational capability is expected in December 2006 and will include a Fire Control Radar demonstration. Eight Comanches are to be produced in FY04. The initial operational tests and evaluation will take place in FY05. The next step in the mid-term is to field 15 aircraft to one cavalry squadron in FY08. By FY10, production should ramp up to 72 airframes per year. The 2000 Army Aviation Modernization Plan indicates the OH-58D will be displaced beginning in FY07, but does not indicate to whom it will be displaced. The Plan goes on to indicate the OH-58D will retire in FY13.

In the long-term (FY08-18), production continues, and aircraft are fielded to the AC and then the ARNG. The ARNG is cascaded AH-64s and RAH-66 in the long-term to fill the MFBs to 23 percent. The ARNG is to receive additional levels of organization after FY2015.

If 72 airframes per year are produced for the 16 years between FY09 and FY24 (72 is a hard ceiling for Boeing-Sikorsky), and Boeing-Sikorsky produces nine

aircraft by FY05 with an additional 15 by FY08, then the most that can be produced out of the proposed 1,213 with a hard ceiling of 72 per year is 1,176 by the end of FY24. That is 37 airframes short of the goal to complete procurement by FY24. No explanation is provided in the 2000 Army Aviation Modernization Plan about these aircraft.

b. Improvements of Integration and Interoperability

Integration and interoperability will begin to improve once the RC MFB structures receive the RAH-66 in 2018. Integration and interoperability are not improved during the mid-term because of this procurement plan.

c. Hindrances to Integration and Interoperability

Although the RAH-66 has many of the expensive systems needed to survive on the global era battlefield, there are many indications that the Comanche may not meet the time schedule or operational requirements that have been set. The GAO found the program to be risky, expensive, and moving ahead at the expense of other fleet modernization and integration alternatives.⁹⁴ GAO findings also indicate that insufficient

⁹³ "Official Launch of New Phase \$3.1 billion RAH-66 Comanche EMD Contract Signed," Boeing Helicopters press release, available Internet: <http://www.boeing.com/news/releases/2000/news_release_000601o.htm>, accessed 20 July 2000.

⁹⁴ The GAO is not so kind in an August, 1999 report: "The Comanche helicopter program with a total projected cost of \$48 billion, is the Army's largest aviation acquisition program. It began in 1983 as an effort to replace the Army's fleet of aging light utility, reconnaissance, and attack helicopters. Since then, the program has been restructured five times, and it is still in development. The first four times, it was restructured because of concerns over program affordability and changing requirements. As a result, planned procurement quantities were reduced, development was delayed, and unit costs increased. In July 1998, the Army restructured the program for the fifth time." The GAO found: "The Comanche's restructured program contains significant risks of cost overruns, schedule delays, and degraded performance because it would (1) begin the engineering and manufacturing development phase before some key mission equipment technologies have matured and have been integrated into the flight-test aircraft; (2) compress the flight-test schedule, increasing the amount of concurrent developmental and operational testing; and (3) begin initial production before initial operational testing starts, resulting in concurrency between development testing and initial production. The program is proceeding to the next development phase with high levels of uncertainty. Successful

near-term funding could lead to a 6 to 12 month schedule delay. The Army also introduces a risk of delays through accelerated technology development, according to the report.⁹⁵ The fewer funds the Army receives for modernization and transformation, the more likely the RAH-66 program will be adversely impacted. Since the 2000 Army Aviation Modernization Plan is based on the assumption that this aircraft will field on time, a ripple effect will occur in the aviation modernization schedules. The ARNG is awaiting modern aircraft until the Comanche is fielded by flying a few OH-58 and AH-64As. The UH-60 program has been delayed to fund the RAH-66 program, thus delaying the Utility modernization of the National Guard. A major finding is that too austere a budget is being placed on the Comanche program at the expense of ARNG modernization. There are many indications that the Comanche procurement plan will be delayed, stretched or cut.

The cost for the Comanche's highly advanced capabilities is high. The GAO reports it to be the most expensive program in Army history (\$4.4 billion for FY1999 through FY2006). Originally designed to be affordable, the program's costs continue to grow. Over 50 percent of program money is being spent on non-aircraft portions of the program. The electronics portion of the aircraft alone costs as much as all aircraft systems combined.⁹⁶

commercial firms generally do not proceed into product development and production with such a high levels of uncertainty.... The Army acknowledges that it will not achieve its goal of executing the Comanche's restructured development program within the planned funding estimate of about \$4.4 billion for fiscal years 1999 through 2006." Rodriguez, "Defense Acquisitions," pp.1-2.

⁹⁵ Ibid.

⁹⁶ Dr. William Foster, "Advancing Vertical Flight Technology", *VERIFLITE*, Volume 46, No. 3, Summer 2000, pp. 12-13.

The RAH-66 offers little cost savings in integration and interoperability. It is possible to select a slightly less capable alternative system that offers a high degree of integration and interoperability and lower operations and maintenance (O&M) cost. The value of ARNG experience and force structure can be capitalized by providing aircrews and maintainers to the Warfight. This research does not conduct a cost effectiveness analysis of the options; many alternatives, however, can be found. For example, seven countries (the United States, Israel, Japan, Pakistan, South Korea, Thailand and Taiwan) are flying the Bell AH-1 Cobra in a variety of configurations. Bell helicopter-TEXTRON offers many configurations and improvements including the AH-1Z and the complementary and interoperable UH-1Y. The O&M of the AH-1 in the Gulf War was considerably less than the AH-64. The AH-1 and UH-1 take advantage of interoperability, thus decreasing life-cycle costs tremendously while using integration and interoperability as a combat multiplier. The combat power the RAH-66 will bring to the 21st century battlefield is substantial, but alternative programs that better support integration and interoperability of the ARNG are a more effective use of available funds. I recommend cutting the RAH-66 program and redirecting funding toward programs that support ARNG integration and interoperability. Program considerations should include cost effectiveness, innovative technologies, interoperability and the personnel assets available in the ARNG to provide combat overmatch comparable to the Comanche, with lower costs.⁹⁷

⁹⁷ Major General Fred Rees, Vice Chief, NGB, "Remaining Relevant, Army National Guard Rotorcraft Aren't Getting Any Younger," *Armed Forces Journal International*, October 2000, p. 22.

There have been some reports that Army leaders have considered reducing the procurement of the RAH-66. The Washington Times reported a memo that states Army acquisition officials recommended a 50 percent cut in the Comanche program (down to 625 helicopters), but so far no such action has been taken.⁹⁸ On the contrary, \$3.1 billion was approved for the Comanche program to enter the engineering and manufacturing development phase on 1 June 2000.⁹⁹

C. SIMULATION

In this section, I argue that training aids, devices, simulators, and simulation (TADSS) improve integration and interoperability. Furthermore, TADSS are currently under-funded and out of concurrency with the aircraft. Interviews at Fort Rucker, my personal experience as a Company Commander in a Cargo/Attack (CH-47D/AH-1F) Synthetic Flight Training Company, and the 2000 Army Aviation Modernization Plan¹⁰⁰ all indicate a serious lack of integration and interoperability between our TADSS and the aircraft.¹⁰¹

⁹⁸ Rowan Scarborough, "Copter Cutbacks Get Army Support," *Washington Times*, 28 February 2000, <<http://wbird.dtic.mil/Feb2000/e20000228copter.htm>>, accessed 1 March 2000.

⁹⁹ "Official Launch."

¹⁰⁰ The modernization plan states, "Aviation Training Aids, Devices, Simulators and Simulation (TADSS) modernization remain critically under funded. Aviation Combined Arms Tactical Trainer-Aviation Reconfigurable Manned Simulator (AVCATT-A), simulator concurrency, is critical to meeting aviation's future training needs." On page 66 of the plan, "The Army will reduce quantities of conversions or recapitalization to find resources for training devices for the fleet." "2000 Army Aviation Modernization Plan," p. 74.

¹⁰¹ Colonel Oliver H. Hunter IV, Commander, 11th Aviation Regiment, Illieshiem, Germany, told the House Armed Services Committee regarding the readiness of the Army AH-64 Apache Helicopter Fleet: "We have a complete suite of simulators out there for all aircraft. It is called the Combat Mission Simulator (CMS). The Blackhawk has its own simulator, et cetera. Although these simulators are very superb training devices, they are very old at this point, and upgrades for those simulators are needed. As the real aircraft get upgraded, new equipment on them, so does the simulator." Cody, *Readiness of the Army AH-64 Apache Helicopter Fleet*, p. 24.

Integration and interoperability deficiencies in the TADSS extend across components and will likely compound interservice collective and individual training problems. The displaced equipment, recapitalized airframes, rebuilt airframes and new procurements all require simulator upgrades. In the past, timely funding and upgrades have not been provided. We have system specific and non-system specific TADSS that are grossly out of synchronization with the aircraft they support. The ARNG AH-1F at the Eastern AATS, for example, supports crew training for aviators across the country, yet still use software developed in the 1980s. Such problems are exacerbated in the legacy ARNG fleet, but not limited to those TADSS. The Longbow Crew trainer is over a year behind in technological upgrades, according to officials at the USAAVNC, Fort Rucker. As we modernize the fleet, supporting TADSS, existing TADSS and the TADSS that support the legacy fleet moving to the ARNG must be kept in harmony with the aircraft they support. In addition, devices must be moved to those geographical locations that are most accessible to the aircrews needing them. Before the new system specific and non-system specific devices are fielded, we must provide qualified aviator instructors and managers for these systems.

Another example of integration and interoperability problems within the TADSS arena is the Aviation Combine Arms Tactical Trainer-Aviation Reconfigurable Manned Simulator (AVCATT-A). (Similar problems exist in the CH-47, AH-64, Longbow, UH-1, UH-60 and non-system specific TADSS.) The AVCATT-A is a mobile, transportable, trailerized collective and combined arms training system with six manned modules reconfigurable to Army rotary wing attack, reconnaissance, cargo, and utility aircraft. It

can be networked with other simulation systems and digital and analog tactical operations centers. This system provides collective and combined arms virtual simulation capability for both the AC and ARNG. The device can be configured for modules that emulate the OH-58D, UH-60A/L, CH-47D, AH-64D Longbow, AH-64A and the RAH 66. During an interview at Fort Rucker, one officer from TSM Comanche stated that, "If the AVCATT-A was delayed, the fielding of the Comanche would be delayed because the new equipment training required the use of this device."

The AVCATT-A is critical to aviation safety and aviator proficiency, and for adherence to the modernization timelines. As the Comanche program moves forward, RAH-66 training is based on the timely fielding of supporting TADDS. Already, the RAH-66 program is being adversely affected by TADDS and associated funding deficits.

The status of the AVCATT-A follows:

- (1) The schedule is slipping by four months because of phased software drops;
- (2) A second schedule slip is expected;
- (3) 01-05 POM funding decreased by approximately \$12 million in FY02, and two of the original 18 planned suites were dropped as a result;
- (4) The Comanche early objective version (September FY02) is unfunded at a cost of \$2.3 million;
- (5) Access to proprietary data required for the Longbow design and development was denied.¹⁰²

¹⁰² Training and Doctrine Command Issue Paper, "Aircraft Training Aids, Devices, Simulators and Simulation (TADSS)," issued by Warrior XXI branch, Fort Rucker Ala., 8 May 2000.

The above example illustrates only one of the devices that are required to make the 2000 Army Aviation Modernization Plan go forward on schedule. The Army historically has skimped on funding for TADDS. The 2000 Army Aviation Modernization Plan emphasizes the importance of and need to fund these devices, yet the budget for TADDS is inadequate.

D. FUNDING THE MODERNIZATION PLAN

In this section, I make one primary argument: the 2000 Army Aviation Modernization Plan is not adequately funded. The inadequate funding hinders integration and interoperability of the Active Component Army and Army National Guard. It will be impossible to maintain readiness, accomplish the myriad of missions expected, or transform and modernize Army aviation within the current budget. Congressional records indicate that Army aviation still has not determined what the actual cost and resource requirements are for the 2000 Army Aviation Modernization Plan. Two examples are cited to elaborate this point. The first example is the cost and complexity of AH-64 recapitalization, enhancements and upgrades. The second example is RAH-66 procurement program costs.

First, it may be that we are costing ourselves out of business with the AH-64A. This aircraft is certainly much more expensive than the AH-1 and there is no congressional obligation to increase operation and maintenance funding. Increases in funding for this program are not in the 02-07 POM, with the exception of 530 AH-64A to AH-64D recaps, of which 29 have been traded off to fix the known safety hazards.

Funding of the AH-64 programs is very complex because of the number of upgrade issues. The multifaceted attack helicopter plan makes budgeting for the airframe difficult. Whether the AH-64 upgrades, recapitalization, and safety enhancements have been funded is difficult to ascertain from congressional testimony and from the 2000 Army Aviation Modernization Plan.¹⁰³ One clear funding issue is significantly higher operation and maintenance costs compared to the AH-1 (see Figure 1.)

Even senior leaders seem to be having a difficult time assessing the AH-64 issues. Inconsistent comments about the program elements lead to the conclusion that some important decisions about the AH-64 program have not been made or funded. In addition, the decisions that have been made do not coincide with the programming and budgeting

¹⁰³ The 2000 Army Aviation Modernization Plan states on page 6 that: "The Aviation Modernization Plan is supported within funding provided in the Presidents 01 budget submission and the Objective Memorandum (POM) 00-05. The Army initiated the New Vision after POM Lock and the details of the Aviation plan presented have not been fully analyzed. Therefore the Army expects changes to this plan and the Presidents 02 submission and resulting POM." Moving AH-64Ds to the Army National Guard was never in the plans. Since the inception of the modernization plan, the idea was to cascade the AH-64As to the Army National Guard, according to Director of Combat Development (DCD) planners at the USAAVNC, Fort Rucker. The plan has always been to cascade AH-64As to the Guard, not to upgrade all of them to Longbow or D models. In a congressional hearing, Brigadier General Hackett stated: "...By the Army National Guard becoming modernized, I can ask for a crew to supplement an operation because I can take them from the National Guard and deploy them with a active component unit, which gives me 24 hour capability. Or I can ask for the entire unit to come, and that gives you that more robust capability, and you double your capability on the battlefield...." A follow on question from Admiral Quigley was whether or not the AH-64 fleet would be pure Longbow: "Correct. It's certainly the intent from everything that I understand is when we get to our fully fielded force, it will be a pure fleet, Delta models and Comanche." Admiral Quigley asked, "Is there a funding requirement associated with the overall modernization plan? And if so, how big is it?" COL McHale responded: "... We're going to be competed, and the Army has not made the decision on exactly how much it will fund and how much in the POM and how much it will structure to be carried on into future years." Admiral Quigley asks: "So wait a minute. You're saying you don't have a ballpark estimate of how much over you are, how much this big, unfunded chunk is for the entire transformation, which we had all understood was going to partly be coming out of your hide, and now its not? So whose hide is it coming out of?" COL McHale responded: "No, I think there is going to be part of it coming out of the aviation hide, and I think that the Army itself will address those. But the reality is, is that those decisions, the final decisions, honestly have not been made." Brigadier General Craig D. Hackett, USA Director of Requirements ADCSOP-Force Development, Lieutenant Colonel Patrick J. Garman, USA, Apache PEO, and Colonel Timothy P. McHale, USA Chief, Aviation Division ODCSOPS-DAMO-FD, Aviation, "Army Aviation Modernization Program," Defense Department Special Briefing to Admiral Craig Quigley, USN, 4 April 2000, reported in *2000 Federal News Service, Inc.*, available Lexis Nexis, accessed 18 June 2000.

cycle. It is doubtful that leaders will fund their decisions in time for the 02-07 POM, and no additional procurement funding is anticipated.¹⁰⁴

Another example of budget and planning imbalance has to do with the RAH-66 Comanche program. The Army is rushing forward with plans to modernize without looking at other options that could improve integration and interoperability in addition to modernizing the force. The cost of the Comanche program is one of the largest in history. Funding the RAH-66 while transforming to the objective force, maintaining readiness and supporting an ever-increasing number of missions is going to be a challenge.

Risk of additional delays and cost increases in the RAH-66 procurement program are well publicized. Nevertheless, the Comanche is still touted as the centerpiece of the 2000 Army Aviation Modernization Plan. The Comanche program consumes proportionally larger shares of the Army aviation budget (up to 2/3 of the aviation budget in FY2008) as more aircraft are fielded.¹⁰⁵

E. SUMMARY OF THE 2000 ARMY AVIATION MODERNIZATION PLAN

In this chapter, I analyzed the three goals and objectives of the 2000 Army Aviation Modernization Plan. I argued that the five key assumptions made in the modernization plan are unrealistic. In particular, two of the assumptions are major hindrances to integration and interoperability. I argue that it is unlikely the RAH-66 is on schedule or that it will improve integration and interoperability even if it is. Furthermore,

¹⁰⁴ Interview with LTC D. McPherson, Directorate of Combat Development, Fort Rucker, Ala., 24 August 2000.

¹⁰⁵ "The Comanche program, as currently planned, absorbs an increasing share of the Army's total aviation budget and accounts for roughly 64 percent of the budget in fiscal year 2008. The plan recognizes that because of funding constraints, some program modernization requirements must be traded off. Rodriguez, *Defense Acquisitions*.

the current budget does not support these modernization decisions. I analyzed the Multi-functional Battalion, attack helicopters, utility helicopters, cargo helicopters, TADSS and funding for the 2000 Army Aviation Modernization Plan.

I describe four major findings in this chapter. One of the findings shows an improvement to integration and interoperability. The other three findings demonstrate hindrances to integration and interoperability that arise from attempts to improve combat capability.

First, favorable changes were evident in planning and coordination activities that forecast cultural barriers were being overcome. These efforts by the three components are bound to improve the integration and interoperability of the branch.

Second, a lack of adequate funding for the 2000 Army Aviation Modernization Plan causes integration and interoperability to either remain constant or decrease. There seems to be some hesitancy in identifying the resource requirements for the plans. Even the modernization plans that have been identified are not necessarily fully funded. Resource requirements need to be better identified and additional funding acquired for transformation to the Objective Force. Otherwise, integration and interoperability will be hampered.

Third, the ARNG needs to keep the second multi-functional battalion in the RC Division structure to support dual mission requirements. Other alternatives to integrate ARNG utility assets must be considered. The second utility company in the RC Division Aviation brigade is crucial to the RC Division Commander to complete domestic missions.

Finally, the Comanche program is too expensive even without the significant trade-offs associated with it that hinders integration and interoperability. Procurement, O&M, and fielding costs are greater than the budget allows, and come at the expense of ARNG and AC integration. TADSS are critical to fielding the 2000 Army Aviation Modernization Plan on time. I recommend funding systems, upgrades, and movement of the devices as part of the transformation to the Objective Force.

V. ALTERNATIVE MODERNIZATION PLANS

In this chapter, I use two examples to demonstrate that modernization and simultaneous improvements to integration and interoperability are achievable. The U.S. Marine Corps (USMC) and the U.S. Air Force (USAF) have chosen to modernize and integrate their reserve components in a different manner from the Army. The first section shows that the USMC has chosen the Bell H-1 upgrade program instead of procuring new aircraft. The decision is cost effective and the H-1 upgrade promotes integration and interoperability. The second section of this chapter argues that the USAF Air Expeditionary Force (AEF) integrates completely the rotary wing assets of the Air Guard. The aircraft are identical and the crews are interchangeable. The USAF has accomplished its modernization side by side with the reserve components, unlike the Army's plan to cascade old equipment to the Army National Guard while modernizing the Active Component Army.

A. USMC ROTARY WING AVIATION INTEGRATION

To supplement a review of the literature, I interviewed two USMC officers and two Bell Helicopter-TEXTRON representatives to compare the USMC modernization with the Army plans.¹⁰⁶ This section contrasts USMC Marine Expeditionary force plans with the H-1 upgrade in the 2000 Army Aviation Modernization Plan.

¹⁰⁶ The information in this section comes from three interviews regarding the USMC H-1 upgrade program. James Sexton, a retired USMC Colonel, was commander of MAG 39 before his retirement. He works in the Public Affairs office at Bell Helicopter TEXTRON, and was interviewed by telephone on 2 August 2000. MAJ David Luckey, USMC, has 18 years of experience in Aviation Safety, Squadron Logistics, and Group Operations. MAJ Luckey was interviewed 14 September 2000 at the Naval Postgraduate School, Monterey, Calif. LTC Michael Rocco, Executive Officer 39th Marine Air Group Camp Pendleton, Calif., was a Marine Air Group commander, an operations/safety officer, and currently is the Executive Officer of MAG 29 at Camp Pendleton. LTC Rocco was interviewed 21 September 2000 at Camp Pendleton, Calif.

This section is divided into 3 sub-sections. First, I discuss assets and missions to identify commonalities and differences between the Army and USMC. The second subsection highlights the integration and interoperability of the USMC systems. Finally, I introduce cost measures associated with the funding of programs.

1. Assets and Missions

For many years after WWII and Korea, the USMC received cascaded equipment from the Army. That no longer is true in the USMC Rotary Wing arena. The USMC purchased the Bell H-1 upgrade program primarily because of the commonality (interoperability) the choice offered, and because of the cost.¹⁰⁷ The H-1 upgrade program recapitalizes both the UH-1N and the AH-1W. Bell strips down the airframes and then rebuilds them to UH-1Y and AH-1Z. Not merely recapitalized but completely rebuilt, these aircraft are expected to be useful until FY2015.

Marine Air Group 39 Headquarters at Camp Pendleton, CA regard modernization, integration, and interoperability from a different perspective than do the Army leaders who were interviewed for this paper. These officers' cultural awareness of integration showed in open and whole-hearted support for their Reserve component. The Command staff enthusiastically described the capabilities of the AH-1Z and the UH-1Y. They are proud that the Marine Air Group Reserve Detachment (Marine Air Group 46) co-located at Camp Pendleton has the same or newer equipment.

¹⁰⁷ MAJ Luckey, interview.

The Bell upgrade was chosen primarily because of the commonality, but also because of the O&M savings. James Sexton of Bell Helicopters stated that the helicopters are 85 percent interoperable. They have the finest FLIR, avionics and electronic surveillance and infrared countermeasures available. They are mounted on a maritime-proofed airframe that is proven in combat at a cost significantly lower than the Army is paying for the AH-64D/RAH-66 and the UH-60. The USMC can purchase the UH-1Y and the AH-1Z for the price of one Comanche. The cost to operate the UH-1Y is significantly lower than the UH-60 Seahawk. (The Army representatives interviewed claimed, however, that the RAH-66 would have capabilities commensurate to the high cost. They would not go into details, but the insinuation was that the RAH-66 was worth the \$21 million per copy.)

Both the AH-1W and Z are quite capable aircraft. In many regards, as MAJ David Luckey, USMC, and Mr. Sexton stated, the AH-1Z is better than the AH-64. It was designed with better FLIR, a four-bladed rotor system, and with air interceptor missile and Hellfire I and II capability. The avionics include electronic countermeasures, SINCGARS radios, HF radios, and GPS (lack of these was one of the problems with the Apache identified in the Task Force Hawk AAR).

The USMC is performing missions well with an aircraft system that costs less than the Army's system. The system is integrated with the reserve component and 85 percent interoperable. The AH-1Z will be capable of carrying 16 Hellfire missiles rather than the eight the AH-1W presently can carry. In addition, the aircraft's formidable on-board arsenal permits the utilization of the Sidewinder missile as well as the Hellfire.

These armament improvements as well as the third generation FLIR, drive train improvements, digitization and electronic countermeasure acquisitions provide adequate combat overmatch to deploy, fight and win on their next battlefield, according to the three USMC aviators interviewed.

The long-range plans for the USMC include V-22 Osprey procurement, development and fielding, while the Joint Task force Fighter (JTF) and JTR are certain to be part of USMC plans.¹⁰⁸

The USMC does not have a dual mission like the Army National Guard; however, it has been MAJ Luckey's experience that the USMC supports domestic missions as well as their traditional warfighting mission. For example, the USMC assisted law enforcement officials with UH-1Ns, CH-46s, and troops to quell the Los Angeles riots in 1992.

According to LTC Michael Rocco, Executive Officer of Marine Air Group 39, the USMC plans the same spectrum of missions as the AC. These missions include: arms control; combating terrorism; DoD support to counter-drug operations; enforcement of sanctions and maritime intercept operations; enforcing exclusion zones; ensuring freedom of navigation and over-flight; humanitarian assistance; military support to civil authorities; nation assistance; noncombatant evacuation operations; peace operations; protection of shipping; recovery operations; show of force operations; strikes and raids; and support to insurgency or counterinsurgency.¹⁰⁹

¹⁰⁸ "Offensive Air Support," MCWP 3-23 Coordinating Draft, Marine Corps Warfighting Publication, Offensive Air Support, Field manual 5-40, 9 May 2000, p. 6-3.

¹⁰⁹ Ibid., pp. 9-27.

The six functions of Marine aviation include: Assault Support; Air Reconnaissance; Anti-Air Warfare; Offensive Air Support including Close Air Support and Deep Air Support (Deep Air Support is further divided into Air Interdiction, Armed Reconnaissance, Strike Coordination and Reconnaissance); Electronic Warfare; and Control of Aircraft and Missiles. One significant difference between the USMC and Army aviation is that the Army deploys large numbers of helicopters in Deep operations during air assaults and Deep attack operations only from land-based areas of operation (AO), whereas the USMC is smaller and more concerned with a much smaller AO that may include shipboard deployments. In the future, using the operational maneuver from the sea concept, offensive USMC operational aircraft may operate exclusively off an aircraft carrier or other amphibious platform. Deployment or movement by sea has a significant bearing on mission availability. One criterion for the value of an airframe is its transportability. Mr. Sexton and LTC Rocco both felt the AH-1 and UH-1 were easier to transport by sea and more sustainable in a maritime environment than the AH-64 or the UH-60. The maritime version of the AH-1W and AH-1Z will provide an aircraft well suited to this mission, according to LTC Rocco.

Although they do not assume Deep Attack rotary wing missions routinely, the USMC plans to cross the Fire Support Coordination Line and the Forward Line of their Troops in specific mission scenarios. Amphibious operations include: Amphibious raids, demonstrations, and withdrawals.

The missions of the USMC also apply to the Marine Expeditionary Forces, and contrast well with the Army aviation rotary wing mission. Significant similarity exists in

the way the two aviation services support the ground commanders. From the National Military Strategy to the Defense Planning Guidance and down to the service chiefs, the missions on which the reserve components and active components base their procurement and modernization decisions are identical. Why has the USMC decided to procure a utility and attack aircraft that is 85 percent interoperable and to modernize their reserve component in cadence with the active component modernization, while the U.S. Army continues to cascade equipment to the National Guard? Are these decisions better, worse or simply different from one another?

2. Integration and Interoperability

The USMC has a relatively small number of rotary wing assets compared to the Army. There are only six Helicopter Marine Light Attack squadrons (HMLA), each of which has eighteen Cobras and nine Hueys (108 Cobras and 54 Hueys total). There are four HMLA squadrons at Camps Pendleton and Lejune, and two HMLA are in other locations. The large difference in numbers of airframes between the Army and the Marines does not preclude comparing the branches' procurement decisions one can assess the USMC program's levels of interoperability and integration quite easily and compare them to similar Army programs. The interoperability of the pilots, logistics, and personnel is only a portion of the benefits derived from USMC modernization decisions. At Camp Pendleton, there is one reserve HMLA squadron on the ground beside its active duty counterparts. The equipment for these squadrons is identical. Sometimes, according to MAJ Luckey, the reserves receive upgrades and new equipment before the Active Squadron. In the training arena, the 39th Regimental Air Group conducted integrated Air

Ground Combat Center Integrated Live Fire. During Desert Storm, the reserves had the same deployment timetables as the active component squadrons.

The reserves are well integrated with the active component Marines. The commander of the reserve detachment and his full time staff are active component Marines. This reserve detachment is collocated with an active component unit. As the full time staff rotates in and out of the detachment, they learn the idiosyncrasies of the reserve component, thus improving integration. MAJ Luckey was a strong advocate for the H-1 upgrade and the commonality the program offered.

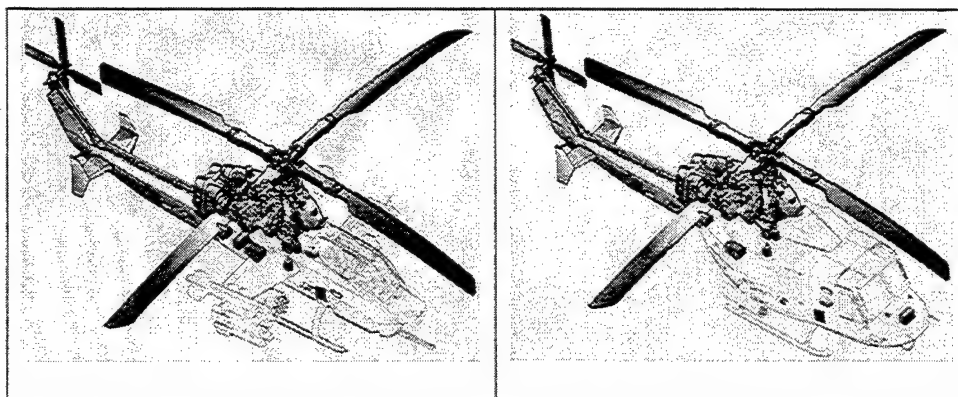


Figure 3. Bell Helicopter-TEXTRON schematic of the interoperable features of the UH-1Y and AH-1Z

Marine aviation performed different types of offensive air support missions during Desert Storm. The USMC reserve detachment (Marine Air Group 46) deployed alongside its Active Component headquarters. AH-1W Cobras, for example, provided close air support by knocking out Iraqi tanks and armored personnel carriers.¹¹⁰ This is exactly the

¹¹⁰ Ibid., pp. 1-2.

same mission performed by the much more expensive U.S. Army AH-64D. Continuing advances in smart weapons technology and tactics provides greater aircraft standoff ranges to the enemy's surface-to-air threat with the addition of the H-1 upgrade. The USMC has participated in numerous missions other than war (MOOTW) since the beginning of "globalization." Operation Restore Hope in Somalia (1992), Operation Deliberate Force in Bosnia (1995), Operation Desert Fox in Iraq (1998), and Operation Allied Force in Kosovo (1999) are all MOOTW where Marine Corps offensive air support has been applied.

3. Funding

The H-1 upgrade program provides an 85 percent interoperability rate for approximately \$6 million per airframe. The AH-1Z and the UH-1Y both can be procured for less than either an Apache or Comanche. The USMC decision to procure the V-22 Osprey is a factor in the decision to buy an H-1 upgrade, because of V-22 procurement costs. The aviators and Bell Helicopter representative interviewed believed that even without the V22 costs, the H-1 upgrades still would have been chosen over the expensive Comanche and Blackhawk because of the commonality, interoperability and smaller logistics footprint. None of the aviators interviewed argued against the fact that the Comanche is a splendid aircraft, but they agreed that the USMC upgrade program was cost effective, efficient, and capable of the full spectrum of responsibilities.

In summary, the USMC has chosen a less expensive modernization program that includes the integration of its reserve component. The units are geographically co-located, and train and expect to deploy together. In contrast, the Army and the Guard are

geographically separated even under the new teaming program ordered by General Shinseki. The aircraft are not interoperable even if the ARNG has an AH-64A and the AC has an AH-64D. Many Guard units have AH-1F and UH-1H helicopters that are not remotely interoperable with the AC. The USMC has funded modernization of its reserve component alongside the active component while the AC has funded the very expensive RAH-66 program at the expense of ARNG modernization. USMC reserve operations and maintenance funds are identical to those of the active component, while ARNG aviation units with few exceptions are funded up to C3 (80 percent).

The Army is sacrificing aircrew proficiency, recruiting, retention, and readiness of its reserve component rather than modernizing the AC and the ARNG side-by-side as the USMC has done.

B. USAF EXPEDITIONARY AIR FORCE PLAN

In this section, I argue that the USAF offers an example to the Army on how to integrate active and reserve components. The USAF Guard and Reserve forces are fully integrated. While USAF funding has much to do with the level of integration and interoperability, the trust and acceptance among the components is just as important to the process of integration. In addition to secondary source research, I conducted an interview with LTC Steven James, a USAF Reserve commander who has had both Army and Air Guard experience.¹¹¹

¹¹¹ Interview by telephone and e-mail with LTC Steven James, USAF Air National Guard, 3 October 2000. LTC James served in command positions with the 129th Combat Rescue Squadron located at Moffit Field, Calif. since the early 1990s. He also served as Assistant Director for Operations. As an aviator with 22 years of experience, he served as a commissioned officer in the Active Component Army and in his current assignment in the USAF. LTC James has personal experience with both the USAF Air Expeditionary Force (AEF) and the U.S. Army Active Component Army and Army National Guard integration issues,

This section has three sub-sections. First, I discuss assets and missions to identify commonalities and differences between the Army and USAF. The second subsection highlights the integration and interoperability of the USAF systems. Finally, I introduce cost measures associated with the funding of programs.

1. Assets and Missions

LTC Steven James, USAF Air National Guard, felt he was well prepared for command with the 129th Combat Search and Rescue squadron through his Army aviation commissioning process and experience. The squadron is an Air National Guard organization equipped with both HH-60s and MC-130s. The MC-130 is both newer and has additional capabilities compared to the HC-130s located, for example, with the Air Wing at Nellis AFB, Nevada.

The AEF concept was fully implemented 1 January 2000, after years of planning. Establishment of these forces was announced by acting Air Force Secretary Whitten Peters and Air Force Chief of Staff General Michael Ryan on 4 August 1999. The AEF were designed in response to increasing demands for forces worldwide. The mission of the AEF is to give regional commanders in chief rapid, responsive, and reliable airpower capabilities and options that meet specific theater needs.¹¹² The design is similar to the U.S. Marine Corps Expeditionary Forces, according to Air Force Chief of Staff General

¹¹² Brigadier General William R. Looney III, USAF, "The Air Expeditionary Force Taking the Air Force into The 21st Century," Mountain home AFB Public Affairs Office, reprinted from *Airpower Journal*, Winter 1996, available Internet: <http://www.mountainhome.af.mil/AEFB/PAFFAIRS/AR.../air_expeditionary_forcetaking_th.ht>, accessed 9 May 2000.

Michael Ryan.¹¹³ The Air Guard provides enough personnel to cover 2,500 jobs in each of two AEFs concurrently deployed. That equals 25 percent of the Air National Guard traditional, Active Guard and civilian personnel rotating on every 15-month cycle. Each deployment lasts about 90 days. Most of the Airmen rotate into theater for fifteen days plus travel time. They operate equipment brought by the first group.¹¹⁴ The 89 Separate Air Force wings, groups and squadrons cut Air Force OPTEMPO through improved Air Guard and Active Component Air Force integration. The Air Force implemented this plan in response to complaints that units were being deployed too often, on too little notice, and they were being worked too hard once they were deployed.¹¹⁵

2. Integration and Interoperability

Unlike the USMC modernization and integration comparison, the USAF has a dual mission and dual tradition similar to the Army National Guard. The Air Guard responds to the Governor and has saved more than 300 lives while performing state duty over the last fifteen years. LTC James acknowledged a huge difference in funding between the Air Guard and the Army Guard. He never had a problem being issued proper flight gear. As an Air Guard Commander, he was able to fund deployments, training missions, and maintenance programs exactly like the Active Component. LTC James felt very strongly that both the active component and reserve component rotary wing assets in

¹¹³ Master Sergeant Bob Haskell, "Air National Guard Vital to Total Expeditionary Aerospace Force," *Air Force News*, available Internet: released 27 September 2000, <http://www.af.mil/news/Sep1999/n19990927_991784.html>, released 27 September 2000, accessed 5 September 2000.

¹¹⁴ Ibid.

¹¹⁵ Frank Wolfe, "AF Restructuring to Employ Guard, Reserve to Cut OPTEMPO," *Defense Daily; Potomac*; 5 August 1998, available Internet: <<http://proquest.umi.com/pqdweb?TS=...&Sid=2&Idx=26&Deli=1&RQT=309&Dtp=1>>, accessed 20 July 2000.

the USAF were funded far better than the AC or ARNG. When asked why he thought that was, given his Army and USAF experience, he responded that he thought the General Officers in the Air Guard and the USAF had a better relationship than the Army component General Officers. His organization has identical or newer equipment than the Active Component Air Force, they can order parts and support equipment at the same priority levels, and they have been able to modernize the Air Force without sacrificing the Reserve component to do so. As far back as 1996, the USAF was transforming and integrating its Reserve components with the modernized systems of today.¹¹⁶

The USAF relies on the Reserve components in the AEF plan. LTC James stated that 80 percent of the combat search and rescue (SAR) is in the Air National Guard. The USAF AEF may even take reliance on the Air Guard to an unprecedented level of integration. Each AEF is on call for 90 days every 15 months. Two AEFs are on call at once while the other eight are either in training or in standing down. An AEF consists of approximately 5,000 personnel.

LTC James cited five positive aspects of the AEF concept from his perspective as a Squadron Commander:

¹¹⁶ Vice Chairman of the Joint Chiefs General Joseph W. Ralston, testifying before the House Military Personnel Subcommittee, articulated the need to: "Seamlessly integrate the Reserve forces for the mission at hand. Combat Commanders must see no difference between the capabilities and readiness of the active and Reserve forces assigned to him. Reserve forces must never be the weak link in an operation...Clear command relationships are best achieved by training together as much as possible before a conflict so they operate together as a team when they deploy.... Codifying the Reserve Commands along individual Service needs recognizes the increased contribution of the Reserves and would formalize many of their roles and responsibilities.... Finally, establishing some quality of life benefits and adequately funding them would enhance the lives of reservists and their families when called upon to serve." General Joseph W. Ralston, USAF, Vice Chairman of the Joint Chiefs of Staff, prepared statement to the House National Security Committee Military Personnel Subcommittee, 106th Congress, 1st session, on 21 March 1999, available Lexis Nexis, Federal Information Systems Corporation, Federal News Service, accessed 20 July 2000.

(1) The Airmen know three years in advance when their squadron is going to deploy. The deployment is for a 90-day period, although the Full Time Unit Support (FTUS) deploy for most of a fifteen-month period. The FTUS are comprised of both Active Guard and Reserve (AGR) and Civilian Technicians. In addition to the AGR and Technician force, a command staff is deployed for most of the rotation.

(2) There is enough funding to cover the operation and travel expenses of the rotation. Because the Combat SAR is depended upon operationally, they are funded accordingly.

(3) Staff continuity during the rotation provides an established and dependable foundation for the incoming units and personnel. A standard operating procedure is developed and the staff merely trains each set of crews rotating into the area of operations.

(4) The deployment is multi-component. The Active Component Air Force, Reserves, and Guard support one another in the AEF rotations. Teamwork rather than parochialism characterizes the AEF components. LTC James believes the Active, Guard and Reserves respect one another equally, allowing them to achieve combat overmatch through interoperable equipment and integrated components. The aircraft and support equipment deployed as part of the AEF stay for the entire rotation. Because the crews all are flying identical aircraft at their home stations regardless of component, they are able to avoid the cost of transporting aircraft to and from the theatre. Aircraft and mission training in the area of operations is not needed other than for indoctrination and familiarization.

(5) Knowing the dates of the rotations three years in advance helps the traditional Guardsman integrate National Guard commitments with professional, educational, and personal endeavors. Airmen have time to plan their deployment with their employers, educational institutions, and families.

There are certain challenges for the Air National Guard during the AEF rotations. As mentioned earlier, the staff and full time support stay on station to provide continuity during the Squadron rotations. This is a commitment of 100-150 days for a traditional National Guardsmen. This OPTEMPO is significantly more than expected for many of the airmen. It is difficult for the traditional Guardsmen to commit to so much time away from their civilian occupations despite the amount of lead-time. When many of these Guardsmen signed up, they intended to deploy only to state emergencies and major theatre wars, if needed. A Presidential Selective Reserve Call-up can be expected in the event of a major regional conflict (MRC) or major theatre war. The ability of the Guard to fully support two MRCs is questionable. Attrition among soldiers returning from back-fill assignments may be significant. Even the FTUS and civilian force are now performing duties for which they did not obligate. Many of the FTUS came to the Guard because they did not want the continuous moves and travel of the Active Components. They chose to serve the dual mission and dual tradition with the expectation of performing most duty domestically, although they are adjusting to the new situation.¹¹⁷ The GAO has

¹¹⁷ LTC James, interview.

confirmed these concerns in a recent report.¹¹⁸ Although this type of expeditionary force plan would work well for the Army, some of these same difficulties may arise as integration increases.

The U.S. Air Force has integrated better and is far more interoperable than U.S. Army aviation. Spreading the number of deployments between the active and reserve components with one third fewer airmen, two thirds fewer overseas bases and four times the number of deployments has helped ease the burden of the global era operational tempo tremendously. The long-term effects of increasing numbers of deployments on the Guard and Reserve are difficult to predict, according to the GAO report.¹¹⁹

3. Funding

LTC James felt the AC and the ARNG never had an equitable amount of training dollars during his 22 years of experience with them. The reason for the funding differences was endemic cultural distrust. The USAF did not have those cultural paradigms, so that planning; operations and budgeting included the Guard. While the attack helicopter and cavalry units of the ARNG (with few exceptions) were on U.S. soil with a legacy fleet of aircraft, LTC James was one of four Air Guard squadron commanders sitting at a table of 12 squadron commanders planning missions for Operation Northern Watch over the Iraqi No Fly Zone. He and his active duty counterparts were totally integrated and interoperable, while the ARNG attack and cavalry units were neither. The USAF already has transformed, modernized and

¹¹⁸ David Mulholland, "EAF is Helping USAF, but Problems Persist," *Jane's Air Forces*, available Internet: <http://www.janes.com/defence/air_forces/news/jdw/jdw000904_3_n.shtml>, accessed 7 September 2000.

¹¹⁹ Ibid.

integrated, and has launched a "Future Total Force" initiative to further improve integration.¹²⁰ It is certain that all ongoing and future efforts will include the Air Guard.¹²¹

The USAF has an interest in the way the Army integrates and modernizes because additional funds given to the Army for modernization could possibly come from the USAF budget. While the USAF has more of the budget to be concerned with, it is easy to see it will not relish giving up a portion of its budget so that the Army can transform to a lighter force.

In summary, the AEF is working extremely well for the USAF. USAF current force structure modernization was begun in the early 1990s, and has transformed the service while maintaining or improving integration and interoperability. In contrast to the Army, the USAF has chosen methods that modernize, train, and task the components in an equitable manner that promotes service unity. USAF funding levels are disproportionately high compared to Army funding levels. One can speculate that, even had more funds been available for Army modernization, the Army still would have modernized the AC and cascaded older equipment to the ARNG because of the historical and cultural tendencies to do so. The USAF also has learned lessons about integration. The reserve components can only absorb a certain amount of the mission load, leading USAF planners to adapt rotation plans that reduce civil-military conflict and support their

¹²⁰ Jefferey R. Barnett, "Funding Two Armies," *Armed Forces Journal International*, May 2000, pp. 14-15.

¹²¹ LTC James, interview.

airmen. As the Army becomes more integrated, an AEF-based plan may facilitate integration of the components.

In conclusion, both the USMC and the USAF have modernization plans that include integration of their reserve components. Although differences in mission and organizational structure are apparent, the similarities offer a unique contrast to the methods of modernization the Army has chosen. The USMC is involved with a major procurement (V-22) that is similar in expense to the Army RAH-66 program. The USMC decided to purchase the H-1 upgrade for both components rather than the more expensive AH-64 and UH-60, in order to modernize both the Active Component and the Reserve component concurrently. The decision provided significant capability while capitalizing on reserve component resources and the logistical cost effectiveness of the interoperability. In contrast to the Army, the USMC moved away from cascading old equipment to the reserve component.

The active component USAF offers the best example of integration and interoperability. Although funding has influenced the degree of integration and interoperability the USAF has been able to achieve, the contrast between its reserve component commitment and that of the Army is profound. The USAF has not cascaded equipment to the reserve components since the 1980s. The level of integration and interoperability within the USAF also provides another lesson for the Army: Sensitivity to the Guard soldier as a civilian has to be considered during deployment planning. The USAF has managed to incorporate a plan that provides three years notice to civilian

employers that an AEF rotation is pending. This innovative, positive, and supportive relationship is working well for the USAF.

VI. CONCLUSION

A. IMPROVEMENTS OF INTEGRATION AND INTEROPERABILITY

I find one improvement to integration and interoperability because of the 2000 Army Aviation Modernization Plan. Cultural changes are necessary to catapult integrated Active Component Army and Army National Guard forces into the objective force. Congress, USMC and USAF plans, interservice programs and necessity are prompting changes in the way we are making decisions within the Army. Senior Army officials are pushing for changes that will include the ARNG in decision-making as the 2000 Army Aviation Modernization Plan continues to evolve. Although this indicates that cultural barriers between the components are diminishing, the AC continues to cascade older equipment to the ARNG.

Generals Eric Shinseki and Henry Shelton, along with the other service chiefs, have informed Congress that modernization and transformation funding is needed. They have explained the readiness trade-offs we have been making for years. Additional funding to pay for the transformation of the Army, including Army aviation, coupled with the increasing cultural awareness displayed by the multi-component leaders, should improve integration and interoperability of the aviation force.

B. DEGRADATION OF INTEGRATION AND INTEROPERABILITY

I have shown three significant hindrances to integration and interoperability because of the 2000 Army Aviation Modernization Plan. First, funding of the plan is not adequate and the majority of risk lies with the ARNG. As the plan currently is written,

each component will have more modern aircraft, but be no more integrated or interoperable than under the Aviation Restructuring Initiative. Not all resources for the 2000 Army Aviation Modernization Plan have been identified. Many conflicting reports on funding coupled with rapid modernization decisions leave little doubt that a significant number of unfunded requirements exist. These modernization decisions are being made just one year before a new administration and the FY2001 QDR.

The global era has increased a need for vertical movement in the battlespace. I argue that as the global era has ushered in a new world and a new mission, it also demands a new method of structuring Army aviation. The cyclic pattern of building up for conflict has been replaced with a need for an integrated and interoperable force able to respond worldwide to a full spectrum of missions.

Unfortunately, funding ambiguities, recapitalization and equipment transfer costs raise doubts about the health of the ARNG in the near- and mid-term. The token interim airframes are inadequate and ill supported. Funding for modernized aircraft and systems should have been provided during the ARI. Now, instead of taking an equal risk in modernization, the AC has pushed the risk onto units it labels as being "not in the Warfight." The USAF funded its Active Component and Air National Guard programs. The USMC did the same for its reserve components. The two sister services do not have any units not slated for the Warfight. The Army claims to be moving away from this mentality, but needs a transitional period to get there. The OH-58C, the AH-64A, the UH-60A, and the CH-47D all require significant funding to make them interoperable with AC modernized aircraft. The AC has few of the airframes that are destined to be the legacy

aircraft of the future if the upgrades are not funded. Neither crews, logistics nor maintainers are interoperable. Army aviation ends up with newer aircraft, but no greater degree of integration and interoperability than exists today. TADSS funding also is necessary for integration and interoperability at all levels and in each component. The modernization plan will not happen on schedule without additional TADSS funding. Equal O&M funding for each component as well as equal responsibility should be a foundation of mobilization. I argue that the designated funding is not aligned with the 2000 Army Aviation Modernization Plan.

Secondly, the ARNG cannot support the AC division aviation brigade without its second utility helicopter company. Only organized at 80 percent from the start, the reserve component division aviation brigade requires the utility assets for an increasing number of domestic contingencies such as WMD, counter-narcotics, and counter-terrorism, in addition to traditional domestic missions. I argue the dual mission requirements warrant a second utility company in the reserve component aviation brigade.

Finally, the plans and budget mismatch is most evident in the Comanche procurement program. Alternative plans must be considered. Delaying, stretching, or cutting the program to modernize both the ARNG and AC is an alternative worth considering. Not only might the RAH-66 be too much combat overmatch for the current threat environment, but also loss of human capital from the ARNG due to frustration and lack of opportunity is too high a price to pay for this program. Sacrificing the Comanche to retain the force is a trade-off we must consider if additional modernization funding is not allocated. Possible alternatives based on reducing or eliminating the RAH-66 program

includes an H-1 procurement program for teamed divisions, or AH-64D and UH-60M upgrades for the ARNG.

C. RECOMMENDATIONS

In this section, I make three recommendations to modify the 2000 Army Aviation Modernization Plan that will improve integration and interoperability.

First, continue and expand integrated planning efforts. Many improvements have been made to the 2000 Army Aviation Modernization Plan since it was signed in April 2000 because of cooperation between the components.

Second, conduct a resource analysis that encompasses all airframe recapitalizations, enhancements, upgrades, dislocations, and movements. Fielding and disposal plan costs; TADSS; new and displaced equipment training requirements; and material are some of the issues that need to be considered. FM 100-11, *Force Integration*, has a great deal of information that can be used as a starting point. Compile these accurate cost estimates and identify the needs to Army and congressional leaders. Cut and delay the RAH-66 program as necessary to fund concurrent modernization of the AC and ARNG. A cost effectiveness analysis of alternatives in which integration and interoperability criteria are heavily weighted will be required. I recommend using external advisors from the USAF, USMC, RAND, and private sector industry to assist with the process. Aviation leaders have not needed to formulate a comprehensive integration-funding plan because the AC tallies neither the planning nor the execution costs of these efforts.

ARNG deployments increased by 300 percent along with the AC in the last ten years. Funding, however, still is prioritized to the active component Warfight units despite the full spectrum of missions the ARNG undertakes. Integration of the Army National Guard and Active Component Army costs more when Guard soldiers are used on active duty. Modernization is not going to come cheaply.

In the meantime, continue the 2000 Army Aviation Modernization Plan with one caveat. Modernized aircraft must be moved to the ARNG as soon as possible. An analysis of assets will be required to see where these AC detachments should come from. One solution would be to move a detachment of the AC teamed unit to the ARNG supporting Army Aviation Support Facility. This process does nothing to spoil the plans underway, yet begins a process of integration and interoperability with funds from a program (the RAH-66) that is likely to experience delays anyhow. Cut, but continue, the RAH-66 procurement program to fund alternative ARNG modernization plans.

Funding for modernization must be planned in a way that demonstrates how national military strategy will be affected if the Army National Guard and Active Component Army are not modernized in concert. Once the needs are identified, funding must be included in the mini-POM; those working on the 2001 QDR for the Army must be fully briefed and prepared for the pending requests.

In July 2000, a GAO report listed three problems with the funding of integration initiatives that hold for the aviation branch as well as the Army. First, the four Guard divisions in the "teaming" initiative are in the fourth funding tier along with Guard divisions that are not teamed. Second, of the fifteen enhanced brigades in the ARNG, the

six integrated brigades are funded the same as those not integrated. Finally, integration funding due to arrive in 2002 may be too late for the teamed divisions and certainly will be too late for the aviation branch if helicopters are needed immediately because of the legacy fleet groundings.

The Department of Defense agreed with the GAO, and stated:

“The equipping issue will remain problematic because resources are not available to fully modernize all units simultaneously, and units with the most current equipment will continue to transfer the equipment to other units with an immediate need.”¹²²

From the tone of this statement, the DOD may still not be ready to fund modernization for the ARNG and AC alike. In order for the ARNG to integrate, it needs like aircraft and support equipment. There also is a time factor: it takes years to train a proficient pilot. The 2000 Army Aviation Modernization Plan underestimates the human element in the modernization. The present integration plan will hurt retention and proficiency of ARNG soldiers.

The GAO report summarizes current Army integration initiatives quite well, and supports the finding that funds for aviation modernization that improves integration and interoperability is wanting. Resources need to be provided specifically to those systems that improve integration and interoperability of the AC and the ARNG. A system that plans, organizes, formulates, and especially, communicates aviation modernization needs to Congress must be created before another dollar is spent on an ad hoc plan with unclear

¹²² “Army is Integrating Active and Reserve Combat Forces, but Challenges Remain,” Letter Report, 18 July 2000, GAO/NSIAD-00-162, available Internet: <<http://www.fas.org/man/gao/nsiad-00-162.htm>>, accessed 24 September 2000, p. 33.

long-term funded modernization goals. The plan should include strategies, goals, policies, and resources. A plan that results in a state of systemic interoperability and integration can be used as a springboard to joint interoperability and integration.

Finally, build an AEF similar to the USMC and USAF plan. Use this method to deploy AC and ARNG rotary wing aviation assets, rather than taking the second utility company of UH-60s from the RC Division Aviation Brigade to augment the AC Division Aviation Brigade. The AEF has worked well for both the USAF and USMC, and there is no reason to think it would not work well for the Army. The Multi-functional Battalion would deploy on a rotational basis under this plan. State Adjutants General would have three years to plan mutual aid and contingencies from nearby states for dual mission requirements. This plan also supports a collective training philosophy, under which the MFB would train and fight together (see Appendix A, Figure 6).¹²³ The AEF plan would dovetail well with the Army teaming plan.

In sum, the Army needs an overarching integration plan with a strategy for modernizing rather than a modernization plan that attempts to integrate the reserve components sometime in the unforeseeable future. The plan must be developed with attainable goals, measurable criteria, and adequate "on-time" funding. The issue ultimately is not one of choice for the Army. 32 USC 102 requires that Guard units stand in the first line of defense, and 32 USC 104(b) requires that the organization and composition of the ARNG be the same as those prescribed for the Army.¹²⁴ In aviation,

¹²³ Email from MAJ Regina Kilmer, Fort Leonard Wood Directorate of Combat Development, 21 September 2000.

¹²⁴ "The 11 Principles: Guiding the Future of the Total Army," National Guard Association of the United States, available Internet: <<http://www.ngaus.org/resources/principle.asp>>, accessed 18 June 2000.

we seem to have forgotten this as the global era supercedes the post-Cold War era. Now the Army is beginning to recognize that it cannot modernize, transform, and maintain readiness without the help of the Army National Guard.

D. SUMMARY

This thesis argues that one primary aspect of the 2000 Army Aviation Modernization Plan supports better integration and interoperability, but three aspects of the plan will lead to constant or decreased levels of integration and interoperability.

(1) The cultural changes that improve integration are evident. Leaders of all components are working toward the best solution as a team.

(2) A lack of adequate funding for the 2000 Army Aviation Modernization Plan will cause integration and interoperability to either remain constant or decrease.

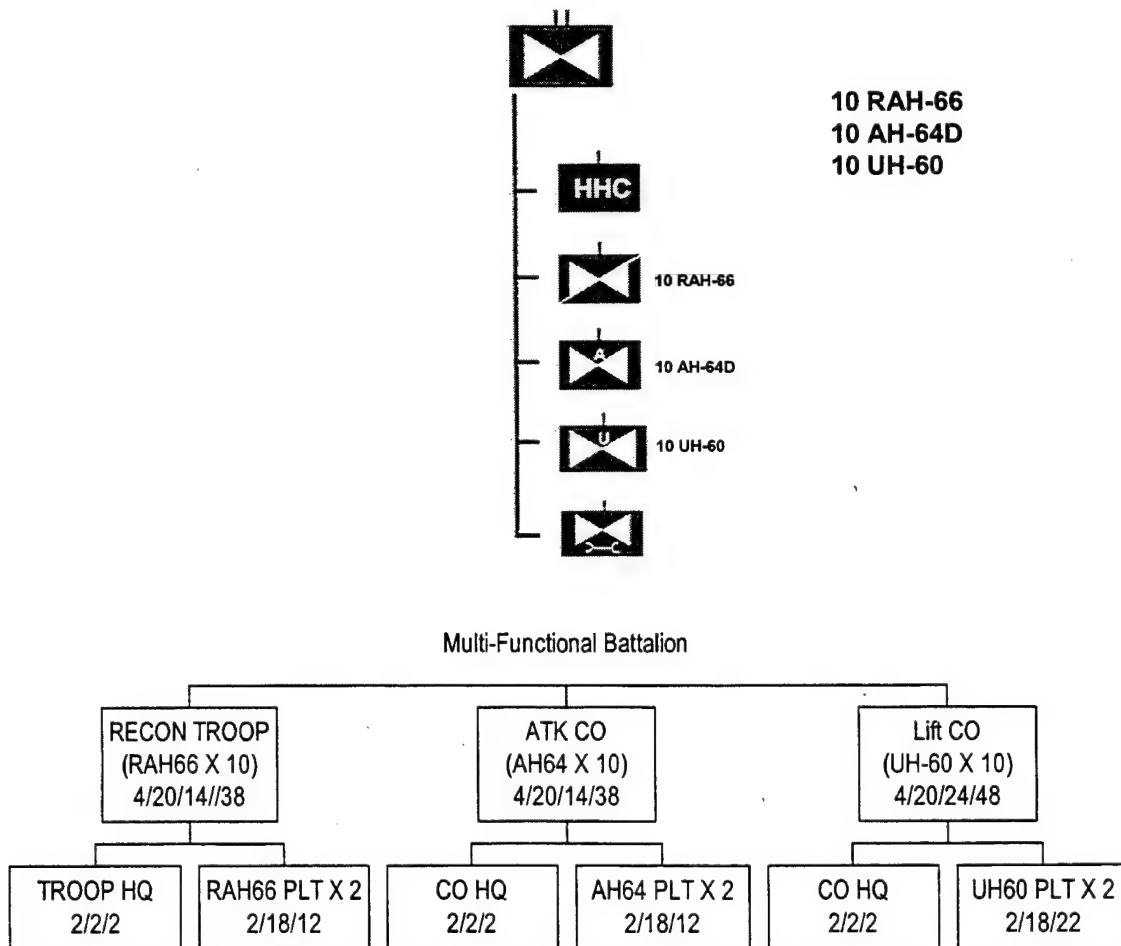
(3) The Army National Guard needs to keep the second utility helicopter company from the Multi-functional Battalion in the RC Division structure to support dual mission requirements. In aviation, the UH-1 has been the vehicle to provide homeland disaster response. With many of these legacy aircraft grounded and the remainder slated for retirement in FY04, one UH-60 Company per state is not satisfactory to fulfill the responsibilities and dual mission requirements of the global era.

(4) The Comanche program is too expensive. Procurement, O&M, and fielding costs are larger than funds available, and will come at the expense of ARNG and AC integration. Integration and interoperability are greatly hindered by putting so many limited dollars in an aircraft that may be too robust for the current world threat.

APPENDIX A.

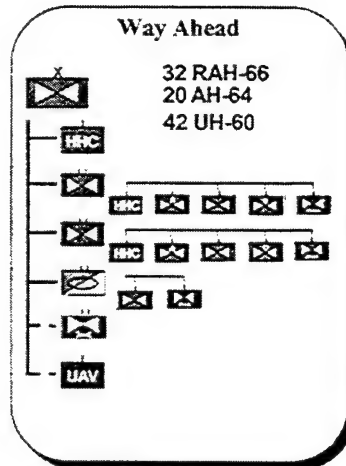
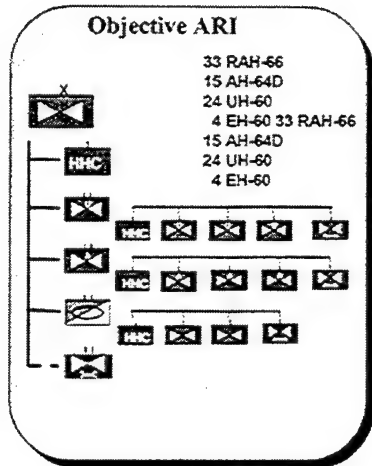
Appendix A contains schematics for the Multi-functional Battalion, the Division Aviation Brigades and the TAA-05 Army Objective. The schematics are followed by an illustration depicting the Corps Team assignments.

Multi-functional Battalion

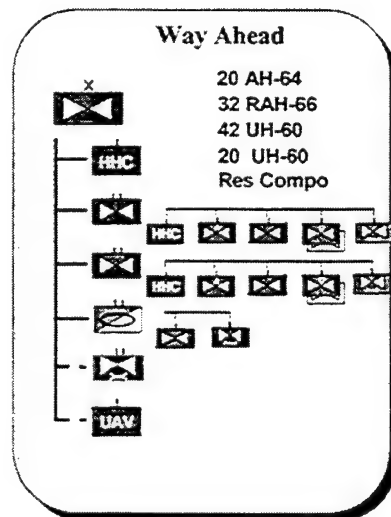
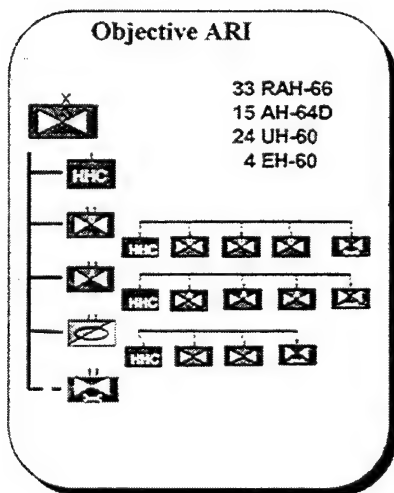


Appendix A, Figure 1. Multi-functional Battalion. Source for figures 1-3: MS PowerPoint presentation by LTC D. McPherson, Fort Rucker, AL; and interview August 24, 2000.

RC DIVISION AVIATION BRIGADE

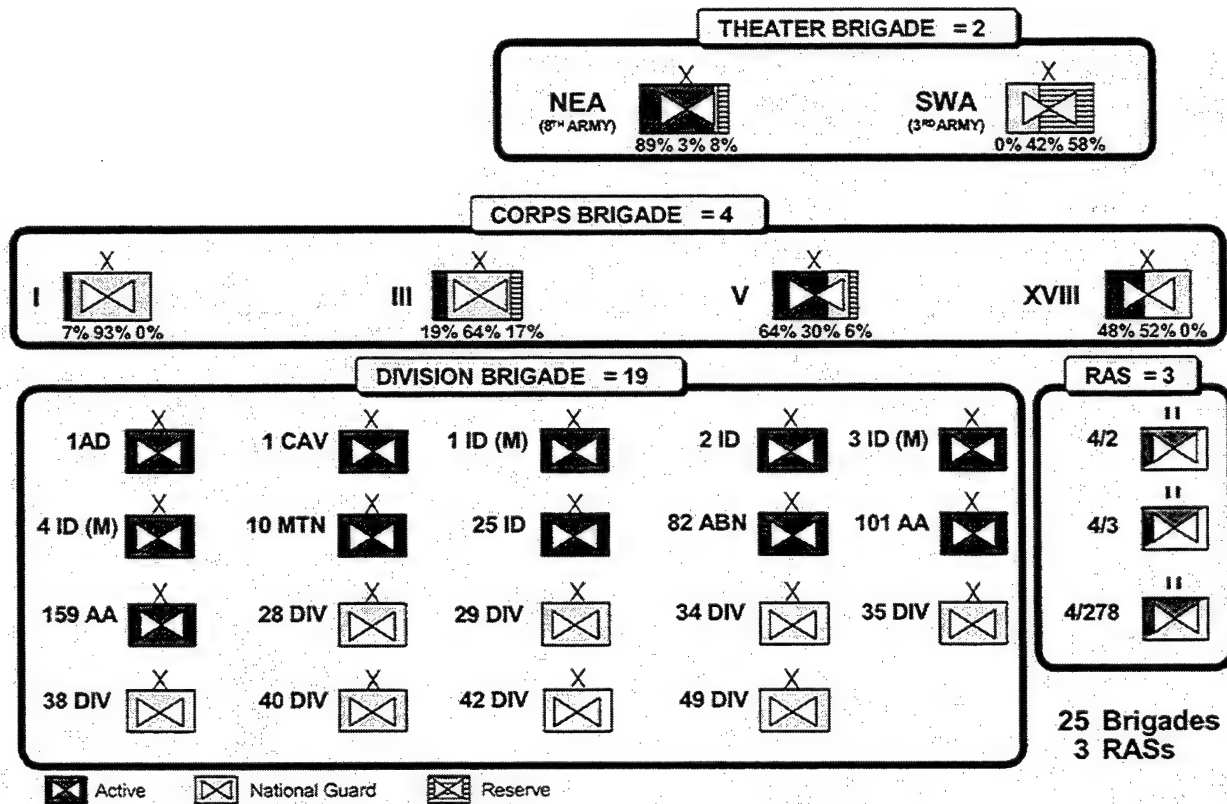


AC DIVISION AVIATION BRIGADE



Appendix A, Figure 2. Division Aviation Brigades.

TAA-05 Organization



Appendix A, Figure 3. The Army.

CORPS TEAMING ASSIGNMENTS OF ARNG Divisions & Enhanced Separate Brigades¹²⁵:

I Corps - Fort Lewis, Wash.

40th Infantry Division (Calif. ARNG, Los Alamitos) teamed with 2nd Infantry Division (Korea)
29th Infantry Brigade (Hawaii ARNG, Honolulu)
81st Infantry Brigade (Wash. ARNG, Seattle)
116th Cavalry Brigade (Idaho ARNG, Boise)

III Corps - Fort Hood, Texas

7th Infantry Division (active division HQ with Army National Guard brigades) (Fort Carson, Colo.)
39th Infantry Brigade (Ark. ARNG, Little Rock)
41st Infantry Brigade (Ore. ARNG, Portland)
45th Infantry Brigade (Okla. ARNG, Edmond)
155th Armored Brigade (Miss. ARNG, Tupelo)
34th Infantry Division (Minn. ARNG, St. Paul) teamed with 4th Infantry Division (Fort Hood)
38th Infantry Division (Indiana ARNG, Indianapolis) teamed with Fort Carson
49th Armored Division (Texas ARNG, Austin) teamed with 1st Cavalry Division (Fort Hood)

V Corps - Heidelberg, Germany

35th Infantry Division (Kan. ARNG, Fort Leavenworth) teamed with Fort Riley, Kan.
256th Infantry Brigade (La. ARNG, Lafayette)
278th Armored Cavalry Regiment (Tenn. ARNG, Knoxville)

XVIII Airborne Corps - Fort Bragg, NC

28th Infantry Division (Penn. ARNG, Harrisburg) teamed with 3rd Infantry Division (Fort Stewart, Ga.)
29th Infantry Division (Va. ARNG, Fort Belvoir) teamed with 10th Mountain Division (Fort Drum, NY)
42nd Infantry Division (NY ARNG, Troy) teamed with 101st Airborne Division (Fort Campbell, Ky.)
24th Infantry Division (active division HQ with Army National Guard brigades) (Fort Riley, Kan.)
27th Infantry Brigade (NY ARNG, Syracuse)
30th Infantry Brigade (NC ARNG, Clinton)
48th Infantry Brigade (Ga. ARNG, Macon)

¹²⁵ Email from MAJ Regina Kilmer September 21, 2000. Email originated Fort Leonard Wood Directorate of Combat Development.

53rd Infantry Brigade (Fla. ANF, Tampa)
76th Infantry Brigade (Ind. ARNG, Indianapolis)
218th Infantry Brigade (SC ARNG, Newberry)

Appendix A, Figure 4. Corps Teaming Assignments, Email from MAJ Regina Kilmer September 21, 2000. Email originated Fort Leonard Wood Directorate of Combat Development.

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11. Dr. Richard Hoffman.....1
Center for Civil-Military Affairs
Naval Postgraduate School
Monterey, CA 93943
12. CPT Eric M. Bleakney.....2
11 Laurel Lane
Lebanon, PA 17046